

Round Hand Alphabet.

A. B. C. D. E. F. G. H. I. K.
L. M. N. O. P. Q. R. S. T. U.
V. W. X. Y. Z. &

abcdefghijklmnopqrstuvwxyz
12345678910.

Take great care & you'll write

FAIR

A. B. C. D. E. F. G. H. I. K. L. M.
N. O. P. Q. R. S. T. U.
V. W. X. Y. Z.

abcdefghijklmnopqrstuvwxyz

Fear God and Honor the King

German Text Alphabet.



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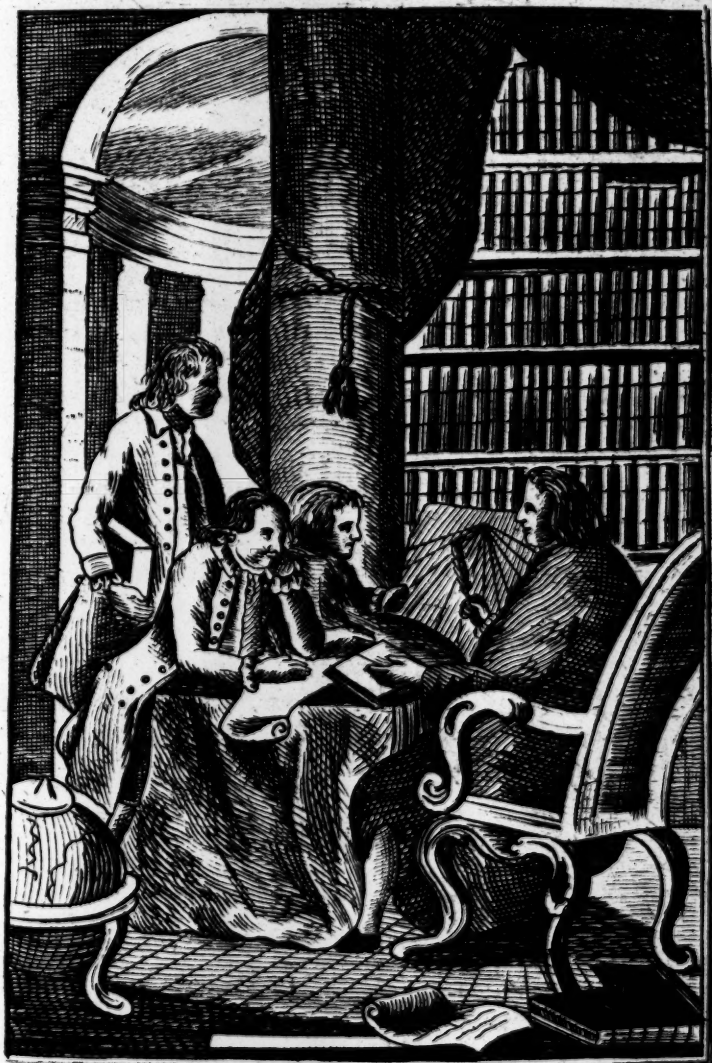
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Fear God and Honor the King

German Text Alphabet.



FRONTISPIECE



*'Tis to the Pen and Press we Mortals owe
All we believe and almost all we know.
All hail ye great preservers of those Arts.
That raise our thoughts and cultivate our parts.*



THE INSTRUCTOR;

OR,
YOUNG MAN'S BEST COMPANION,

CONTAINING,

SPELLING, READING, WRITING, and ARITHMETIC, in an easier Way than any yet published; and how to qualify any Person without the help of a Master.

INSTRUCTIONS to write variety of Hands, with Copies both in Prose and Verse. How to write Letters on Business or Friendship. Forms of Indentures, Bonds, Bills of Sale, Receipts, Wills, Leases, Releases, &c.

Also MERCHANT'S ACCOUNTS, and a short and easy Method of Shop and Book-keeping; with a Description of the Product, Counties and Market Towns in ENGLAND and WALES, and a List of the Fairs according to the New Style.

Together with the Method of Measuring Carpenters, Joiners, Sawyers, Bricklayers, Plaisterers, Plumbers, Masons, Glaziers, and Painter's Work, how to undertake each Work, and at what Price; the Rates of each Commodity; and the common Wages of Journeymen, with the Description of Gunter's Line, and Coggeshall's Sliding-Rule.

Likewise the PRACTICAL GAUGER made easy; the Art of Dialling, and how to erect and fix Dials; with Instructions for Dying, Colouring, and making Colours; and some General observations for Gardening every Month in the Year.

TO WHICH ARE ADDED,

THE FAMILY'S BEST COMPANION,

AND

A COMPENDIUM of GEOGRAPHY & ASTRONOMY,

ALSO

SOME USEFUL INTEREST TABLES.

By GEORGE FISHER, ACCOMPTANT.

London:

PRINTED FOR THE BOOKSELLERS.

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# P R E F A C E.

I NEED say but little by way of Preface, in relation to the usefulness of this Book, the title page so fully declaring its contents; but as a preface is generally expected, I cannot well avoid saying something with respect to its utility.

As to the first step of forming the young man's mind for business, viz. the being instructed in and acquainted with our mother tongue, viz. English, it must be and is acknowledged by all, to be a necessary and principal qualification in business, and therefore it is of great importance to be well acquainted therewith.

In the next place, to write a good, fair, free and commendable hand, is equally necessary in most, if not in all the affairs of life, and occurrences of business.

The young man is, next, informed how to indite epistles or letters in a familiar style, and on sundry subjects or occasions; with directions how to subscribe or conclude a letter and also to superscribe or direct letters, according to the different ranks and qualities of the persons to whom directed; and this must be allowed to be a very great additional qualification.

The next accomplishment for a young man, and largely treated on in this book, is that excellent science of Arithmetic, both vulgar and decimal; leading him by the hand, and by easy steps, through its whole course.

Again, the young man is next shewn the ingenious art of Book-keeping after the Italian manner, by way of double entry; and that is an accomplishment that capacitates him for business in the highest degree; under which head, he is also informed how to draw out, or make various accounts or writings relating to mercantile affairs; as bills of lading, invoices, accounts of sales, together with authentic examples of bills of exchange, with notes concerning them; likewise bills of parcels of divers kinds; also various sorts of receipts, &c. All which is expedient for a young man to know and understand, if he would be dexterous in business.

The young man is here also instructed in relation to the affairs of business at the water-side, as to shipping off and landing goods, &c.

He hath also a description of England and Wales, each county being particularly spoken of, with respect to its produce, soil, and extent; likewise the names of its several market-towns, and a list of the fairs now held in them, as they have been settled since the alteration of the stile.

Here are also easy, plain, and likewise curious directions for measuring all sorts of planes and solids, (arithmetically and instrumentally) as the works of carpenters, joiners, sawyers, bricklayers masons, plaisterers, painters, glaziers, &c. with the prices of their works.

Here are likewise shewn the methods of extracting the square and cube roots, with some of their uses, in relation to measuring, &c.

Also practical gauging, of divers kind of vessels, tuns, &c. Likewise dialling in various kinds, with the representation of several sorts of dials, and how to beautify and adorn them.

Next are precedents of law writing, as bonds, bills, indentures, wills, letters of attorney, &c.

Lastly, some directions relating to the pleasant and delightful art of gardening, with general observations for every month in the year. To which are subjoined, some instructions to young women, how to pickle and preserve all kinds of fruits and flowers, &c. with instructions for making divers sorts of wines, of English growth; and also for preparing many excellent medicines, plaisters, &c. with several good prescriptions of proper use against most distempers; fit for, and necessary in all families.

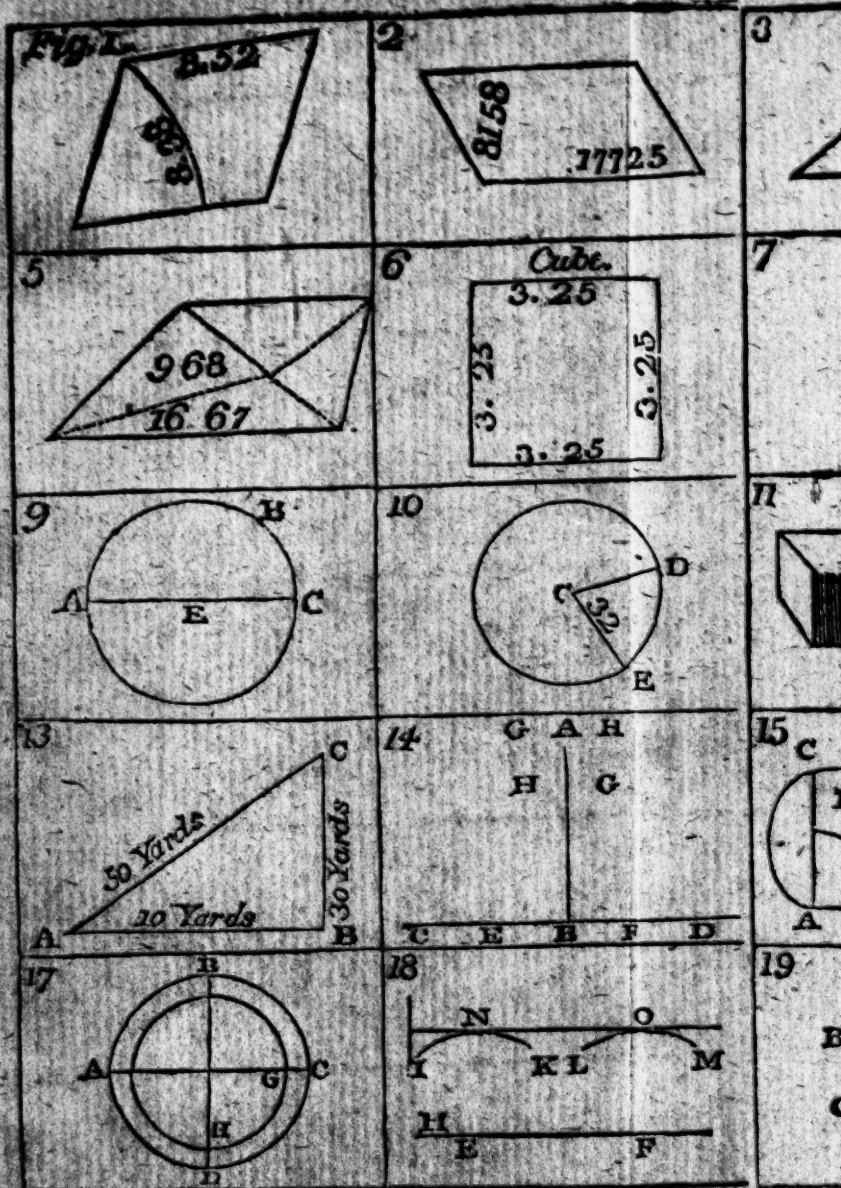
To the whole is now added, a compendious system of geography and astronomy; the first is of great utility to the trading part of mankind, and to those who would have an adequate idea of what they read in history, or otherwise, of the transactions in different parts of the earth: and the second is of like service to those who would contemplate on heavenly bodies, and is purposely designed to give the unexperienced reader some small idea of the almost inconceivable number of bodies (most of them much superior in magnitude to our world, as we vainly term it) which the Almighty and infinite Creator hath placed in the universe, and exhibited to the view and conception of mankind.

Also concise tables to find the value of Portugal pieces, to buy or sell by the great hundred, and to shew the interest of any sum, at 3, 4, and 5 per cent.

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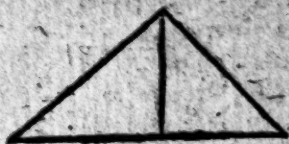
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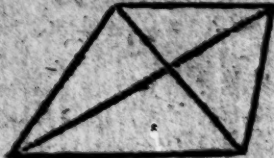




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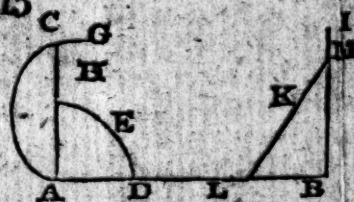
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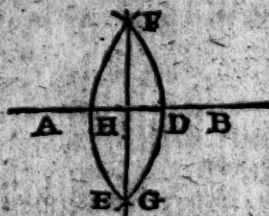
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INSTRUCTIONS  
FOR  
YOUTH,  
TO SPELL, READ, AND WRITE  
TRUE ENGLISH.

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*The use of Letters; which are Vowels and which are Consonants; what Diphthongs are, their number, and how pronounced and written.*

THE design of this book being to instruct mankind, especially those who are young, in the methods of conversing and transacting business in the world; therefore, that most necessary accomplishment of spelling and writing good and proper English claims the first notice: for, let a person write ever so good a hand, yet if he be defective in spelling, he will be ridiculed and contemptibly smiled at, because his writing fair will render his orthographical faults the more conspicuous. Therefore,

*First, Take notice, that of letters are made syllables, of syllables words, and of words sentences, &c.*

The letters are in number 25: viz. *a, b, c, d, e, f, g, h, i, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, and z*; of these *j*, and *v*, were formerly wrote *i*, and *u*, and have for that reason been frequently called *i* consonant, and *u* consonant; but they have been of late more properly called *ja* and *ve*. In

these letters we are to observe their names, their form, and their forces, their names whereby to know them; their form, whether great or small: and their force, whether in pronunciation or utterance.

Letters are distinguished according to their sound, into vowels and consonants. A *vowel* is a letter that soundeth by itself, and they be six in number, viz. *a, e, i, o, u,* and *y*, the Greek vowel, which is an English vowel when it cometh after a consonant, and hath the sound of *i*, as in *by, fly, reply, syllable, &c.* but it is never used in words not derived from a foreign language, or otherwise than at their end. A *consonant* is a letter that soundeth not, except it be joined with a *vowel*, for without one of the vowels, no syllable can be made; as *b, c, d, &c.* without the aid of a vowel cannot be sounded. Though we have twenty-six letters, and six of them vowels, yet we have twenty-one consonants; for *y*, when set before any vowel, in the same syllable, becomes a consonant, as in *youth, yonder beyond, &c.* Note, that *j*, hath the sound of *g*, as in *join, jingle, jangle, &c.*

When two vowels come or meet together in a syllable, and are not parted in the pronunciation; but united in one sound, such are called *diphthongs*; of these there are thirteen, viz. *ai, ei, oi, ui, au, eu, ou, ee, oo, ea, eo, oa, and ie*; as in *mail, faith, either, join, juice, and eunuch stout, feed, food, broad, stealth, wealth, people, steeple, boat, goat, beat, heat, feat, friendship, field, &c.* Note, That in the first seven words, both vowels are sounded, but in the other fifteen, one of them is scarcely heard.

There are also those that are called *tripthongs*, where three vowels meet in one sound; as in *beauty, beau, lieu,* and *quaint*, likewise *ay, ey, oy, uy, aw, ew, ow*, become *diphthongs* at the end of words; but are *improper diphthongs*, as in *say, key, joy, saw, how, &c.* Note, *aw, ew, and ow*, are commonly sounded as *au, eu, and ou*.

*Of letters great and small, and when to be used.*

**F**IRST, negatively, *great letters* are not to be used in the middle of latter end of a word, except the whole word be so written, as in *JEHOVAH, LORD*, or in titles of books, &c. for it would be very absurd to write thus: To

Mr



Mr. George R. Gers, in the Mes. S. Re. Et: instead of To Mr. George Rogers in Thames Street,

Secondly, positively, *great letters, or capitals*, are to be written at the beginning of sentences; as *Fear God Honour the King, Know when to speak, and when to hold your tongue.*

After every period or full stop, when new matter begins, as, *Sometime after that accident, another happened which was as follows, On the 16th of May, &c.*

At the beginning of all proper names of places, ships, rivers, &c. as *London, the Dreadnought, Thames, Severn*; also the christian names and surnames of both men and women must begin with a great letter; as *Samuel Sbarpe, Mary Sweetings, &c.*

At the beginning of the more eminent words in a sentence; as *Faith is the Foundation of the Christian Religion*; or of any word that we have a particular regard or deference for; as *God, Christ, King, Queen, &c.*

At the beginning of every line of poetry; as,

*Improve your time. Time passeth quickly on;  
Nor doth so good succeed as that that's gone.*

At the beginning of the names of arts, sciences, and trades: as *Writing, Arithmetic, Geometry, Music, Carpenter, Smith, &c.*

Note, The personal pronoun *I*, and the interjection, *O*, must be always wrote in capitals; for it is ridiculous to write thus, *On Monday last I came to your house, but you was not at home; o how much it grieved me!*

Lastly, All nouns substantive may begin with a great letter; and a substantive may be known by the signs either of *a, an, or the*, before them; as, *a House, a Mill, an Ox, an Ass, the City, the River, &c.* but the adjective, (which declares what sort of thing the substantive is) should be wrote with a small letter; as, *the white horse, the long Rope, brown Bread, fat Beef, &c.* Small letters are commonly wrote in all other places. Note, This custom of beginning all substantives with capital letters is not followed at present, by polite authors.

*S* is commonly written / at the beginning and in the middle of words and s at the end; but if two of them come together in the middle of a word, they may be written thus, *ss, or ss.*



Observations concerning the Sound of Letters, and which are omitted in pronunciation.

**A** is not sounded in *Pharaob*, nor in *Sabbaoth*; but as if written *Pbaro* and *Sabbatb*; neither in marriage, but as *marrige*; also parliament as *parliment*, and chaplain as *chaplin*, &c. In some proper names it is not sounded, but dropped in the pronunciation; as in *Aaron*, *Isaac*, *Canaan*, *Balaam*; which are pronounced *Aron*, *Isac*, *Canan*, *Balam*; but we must except *Ba-a* and *Ga-at*. *A* is sounded broad like *aw*, in words before *ld* and *ll*, as in *bald*, *scald*, *ball*, *wall*, *fall*, &c.

*B* is not sounded in *dumb*, *thumb*, *plumb*, *lamb*, *doubt*, *debt*, *subtle*, &c. but sounded as if written, *dum*, *thum*, *plum*, *lam*, *dout*, *det*, *suttle*.

*C* is sounded hard like *k*, before *a*, *o*, *u*, and before *l*, and *r*; as in these words *cane*, *came*, *comb*, *cube*, *clay*, *crab*: and soft in *comet*, *city*, and *tendency*. *C* loseth its sound in *scene*, *science*, *viſuals*, and *verdict*; likewise in *indict* *indictment*: also before *k*, as in *stack*, *tack*, *kick*, *thick*, *brick*: in words of Greek and Hebrew derivations, *c* is sounded like *k*, as in *sceptic*, *skeleton*, *Cis*, *Aceldama*.

*Cb* is sounded like *k*, in many foreign words, some of which occur in the holy scriptures; as in *chorus*, *chemist*, *Cbrysostom*, *Cbrist*, *Cbedariaomer*, *Baruch*, *Archippus*, &c. In the word *schism*, the sound of *cb* is lost, it being sounded as if wrote *sism*; and in the words *Rachel*, *Cberubim*, and *Archbishop*, it is sounded in the English manner. *Cb* in French words sound like *sh*, as in *chevalier*, pronounced *shevalier*; *machine*, *mesheen*; *marisebal*, *marsbal*: *capuchine*, *capueben*; *chaise*, *shaise*; &c.

*D* is not sounded in *ribband*, nor in *Wednesday*; which are pronounced *ribbin*, and *Wensday*; the termination *ed* is often shortened into *t*, as *burned*, *burnt*; *choaked*, *choakt*; *ripped* *ript*; *passed*, *past*; *chopped*, *chopt*; &c.

*E* is not sounded in *heart*, neither in *heartb*, or *deartb*, &c. *E* final, that is placed at the end of a word, is seldom heard but in monosyllables: as in *me*, *be*, *sbe*, *ye*, *the*, &c. where it hath the sound of *ee*: and in words derived from foreign languages; in which *e* hath its perfect sound, as *jesse*, *jubilee*, *Mamre*, *Nineve*, *Candace*, *Gloe*, *Eunice*, *Penelope*, *Salmone*, *Poebe*, *epitome*, *catastrophe*, *Getbsemene*, *simile*, *premunire*, &c. In all other cases *e* final serves only to lengthen the sound,



sound, and to distinguish it from other words of different meaning, which are wrote without *e*, and are sounded short; as in these examples following, viz. *cane, can; bate, bat; bite, bit; fae, fur; hope, hop; made, mad; mane, man; scrape, scrap; stare, star; tune, tun; write, writ; &c.* In words of more than one syllable, it lengthens the sound of the last syllable, but doth not increase the number of syllables; as *admire, demise, blaspheme, &c.* *E* lengthens the syllable in some foreign words, as in *Eve, Tyre, Crete, ode, scheme, dialogue, Kenite, and Sbula-mite.* *E* is seldom writ after two consonants; as in *pass, turn, black, not passe, turne, blacke.* Yet after *rs* it is used, as *horse, nurse, purse; not hors, nurs, purs.* Also the words ending in *cre, gre, and tre,* sound the *e* before the *r*; as in these words, *acre, lucre, centre, sepulchre, tygre, maugre, mytre, lustre;* which are sounded *aker, lücer, center, sepulcher, tyger, mauger, &c.* *E* final also serves to soften *c* and *g*, as in *ace, place, lace, spdee, truce, oblige, buge, age, &c.* If nouns in *e* final take *s* after them with an apostrophe before, it stands for *his* as the *Pope's eye*, or the *eye of the pope*: the *table's foot*, or the *foot of the table.* if without an apostrophe, it makes the plural number, as *popes, tables.* Words derived from those wrote with *e* final seldom retain it as in *writing, loving or doing, &c.* not *writing loveing or doing*; except in the terminations *ge* and *ee*, before *able*, as in *changeable, prateable, &c.* *E* should not be written after a diphthong in these words, *vain, main, gain, fear know, &c.* not *vaine, mains, gaine, &c.* *E* final is annexed but not sounded in those words which would otherwise end with *i, o, or u*, as in *die, foe, shoe, true, virtue, &c.* but there are some exceptions, as *do, so, to &c.* Lastly, there are some words in which the final *e* doth not lengthen the sound, as *give, live, some, one, done, &c.*

*G* is not sounded in *sign, reign, gnaw, gnat, assign, design, seignor, seraglio, pblegm, &c.* *G* is sounded soft in *gender, ginger, and gipsy;* but hard in *Gibeon, Gibberah, Gilboa, Getsemane;* and in these proper names *Gibson, Ginnian, Gilbert;* and likewise in these common words, *gelt, geld, gird, gimp, geese, gander, gabble, gather, gird, &c.* Observe That if *g* be hard with a long vowel, *ur*, is joined and pronounced in the same syllable; as in *plague, Prague, Hägue, rogue, league, dialogue, catalogue, &c.*

*Gb* in the end of some words, where *au* or *ou* goes before, hath the sound of *ff*, as in *tough, rough, cough, laugh,* sounded

as if *tuff, ruff, coff, luff*, but *buff, cuff, snuff, and buff*, must be so written — *Gb* is not sounded in *migh**t**y, thoug**b**, throug**b** daughter, and Vaug**h**an.*

*H* hath place, but no sound in *chronicle, Christ, Ghost, Jobn, Ebins, Schedule, and schism, &c.* *H* is not sounded at the end of a word if it be alone; but with *c* before it, it is sounded as *snatch, watch &c.*

*I* is not sounded in *adieu, juice, venison, fruit, bruise, Satisfury*; it is sounded like *ee* in *oblige, magazine, and machine, &c.* *I* is sounded long in proper names ending in *iab*, as *Jeremiab, Hezekiab*, but short in *Ariel* and *Miriam*. *I* is sounded like *u*, in *first, dirt, bird, &c.*

*K* is nearly allied in sound with *c*; but to know when to use one, and when the other, note, that *c* hath the sound of *k* only before *a, o, oo, and u*, and those two consonants *l* and *r*; and therefore we must not write *kare*, for *care*; *kow*, for *cow*; *krown*, for *crown*; and the use of *k* is only before *e, i, and u*; wherefore we must write *keep, key, knight, kill, &c.* not *ceep, cey, night, nor cill*; but the words *calendar Catherine*, are wrote sometimes *kalendar, Katherine*. *K* is written after *c* only in pure English words, such as *back, deck, sick, &c.* for the best authors have omitted it in words derived from the Greek and Latin, such as *public, music, poysic, &c.*

*L* is not sounded in *calf, balf, chalk, stalk, walk*, those words being pronounced as if written *case, bafe, chauke, slauk, wauk*. Neither is *l* pronounced in *Bristol, Holborn, Lincoln, samon, chaldron*; these are sounded as if written *Bristew, Hobeurn, Lincon samon, and chadron*: nor in *colonel*, where the first *l* hath the sound of *rr*, as *corronel*.

In the word *account*, *mp* is sounded like *un*.

*N* is not heard in *autumn, kiln, solemn, linn, hymn, column and condemn*.

*O* is not sounded in *people, feoffe, bason, muttan, yeoman, reason, righteousness, bacon, jeopardy, and crimson*. — *O* sometimes sounds like *oo*, as in *doing, moving, proving, &c.* *O* is not heard in *damosel, carrion*, but pronounced as if writ, *damsel, carrin*. — *O* is sometimes sounded like *i*, as in *women and flagon*, pronounced as if written *wimmen, flagin*. And sometimes *o* is sounded as *u*, as in *money, conduit, confure, attorney, Monmouth, &c.* being heard as if writ *muneey cunduit, cunjure, atturney, Munmouth, &c.* and it is sounded like *oo* in *do, to, prove, move, &c.*

*P* is written but not sounded in *empty, presumptuous, psalm, psumpter,*

*psampler, attempt, psalter, and symptom*; also in *sumptuous, contemptuous, receipt, and consumptive, &c.*

*Pb* hath the sound of *f* when together in one syllable; as in *philosophy, physician, Asaph, and Elepbant*; but we must not write *flosophy, fscian, not asaf, or elefant*; *Pb* are parted in *shepherd, uphold, and in Clapham, and other such compounded words.*

After *Q* always follows *u* in all words; and in some French and Latin words they have the sound of *k*; as in *risque, liquor, catholic, banquet, conquer, masquerade, chequer*: pronounced as *risk, likker, catholik, banket, &c.* to which add *oblique, relique, antique, &c.* which are sounded as if written *oblke, relke, antike, &c.*

*S* is not sounded in *island, viscount, isle, and Lisle*; which are pronounced as if wrote *iland, viscount, ile, and Lile.*

*S* at the end of words sounds hard like *x* in words of the plural number, and in words of the third person, as *names, worms, he reads, she bears*. *S* sounds hard in some words that terminate in *sion*, as in *circumcision, evasion, delusion*; but after a consonant soft, as in *conversion, commission, dimension*. *S* is sounded hard in these words, *raise, praise, chaise, cheese, these, compose, expose, bruise, refuse, applause, clause, wisdom, easement, and damosel.*

*Tb* sounds fine in *thin thick & wrath*, and is sounded hard in *the, then, they, that blythe, tytbe and scytbe, also in mother brother, bither, thither, and in loath, cloath, and clotier, &c.*

*Ti* before a vowel or diphthong hath the sound of *si* or *sb*, as in *patience, dictionary, Gratian, oblation, nation, translation*; except when *s* goes before it, as in these words, *question, fustain, bastion, combustion, celestial bestial, &c.* but in some words of Hebrew and Greek, *ti* retains its natural sound, as in *Sbealtiel, Phaltiel, Shephatiah, Catittia, Adramyttium, and the like*; and in the English derivatives, *mighlier, and mightiest, emptiest, emptied, pitiable, &c.*

*U* is sounded like *i* in *bury, birry; busy, bizzy; business as bizziness*. *U* is sometimes written after *g* without being sounded, as in *guide, guard, &c.* It is also silent in the words, *buy, build, conduit, circuit, labour, favour, honour, &c.* but it is sounded in others, as *anguish, languish, Montague, &c.*

*W* is not sounded in *answer, sword, whale, swoon, &c.* neither is it heard before *r* in *wrath, wrap, wrong, wretch, wyeath, wrangle, wriggle, &c.*

*Wb* be-



*Wh* belongs to words purely English; as *what, when, where, and wheel.*

*X* is sounded as *z* in *Xenophon, Xerxes, Xenocrates, and Xantippe.*

*Y* is either a vowel or consonant as hinted before. A vowel in *my, by, fly, thy,* and sometimes when a vowel, it hath the sound of *ee*, as in *worthily, christianity, liberty, formerly, formally, Normandy, and Dorothy.* In derivative English words, having the termination *ing*, *y* is used in the middle of the word, as in *buying, dying, burying, marrying, &c.*

The diphthongs *ai* and *ay* have the sound of *a*, in *air, fair, pair, may, stay, play;* but *a* is lost in *Calais* (a town in France) and pronounced separately in *Sinai* (a mountain of Arabia.)

*Ei* & *ey*, are sounded like *a* in *eight, streight, neighbour, heir, veil, and convey;* like *e* in *key;* and like *i* in *sleight.*

*Oi* and *oy*, have a sound peculiar to themselves: as in *oil, and oyster;* but make no diphthong in the derivatives, *going, doing, &c.*

*Au* and *aw*, commonly keep a proper sound; as in *augur, austere, draw, maw, saw, &c.* but *u* is lost in *aunt* & *gauger*, being sounded as *ant* & *gager;* they make no diphthong in *Emmaus, and Capernaum.*

*Eu* and *ew* have an united sound in most words, as in *feud, brew, new, and grew;* but *eu* is no diphthong in *Zaccheus, and Bartimeus.*

*Ou* is expressed in *foul, soul, proud, loud,;* and *ow*, in *bow, cow, and now;* but *ou* sounds like *oo* in *soup, a* (French dish) and *Cowper, a* (man's name) which are sounded as if written *soop, and Cooper.*

*Ee* is no diphthong in *Beerits, Beersheba,* and in words beginning with *re* or *pre*, as *reenter, preeminence;* in *Beelzebub*, one of the *e*'s is not sounded.

*Oo* is properly sounded in *cool, fool, pool, root, and took,* but hath the sound of *u* in *soot, and foot;* it makes no diphthong in *Goos cooperate.*

*Ea* sounds like *e* in *sea, pea, seam, ream, bread, bead, lead, dead, leather, feather, heaven, leaven, and creature;* it is no diphthong in *vengrance, miscreant,* or any Hebrew, Greek, or Latin words; as in *Kadesb Barnea, Kirjath jearim,* nor in *Cesarea, idea, ocean, real beatitude Creator;* nor in words beginning with *pre*, as *preamble, &c.*

*Ee* is

EO is no diphthong in *dungeon, hideous, meteor, pigeon, theory, &c.*

OA is sounded like o in *goat, boat, coal*; it is sounded broad as au, in *broad, groat*; but is no diphthong in *Goa* (a city in India) or in the Hebrew words *Zoan, Giboa*.

IE before a single consonant sounds like *er*, as in *brief, thief, and thief*; but if before two consonants it sounds like *ea*, as in *friend, field*; but at the ends of English words, the *e* is not heard, as in *die, signify*; it is no diphthong in *Abiezer, Eliezer*, nor in the English words *dier, carrier, clothier*; nor in the words derived from the Latin, as *client, orient, quiet, and science*.

UI is sounded as u in *juice, fruit, and suit*, but u is lost in *conduit, build, and guise*; and is no diphthong in *Jesuit, genuine, and fruition*.

Æ and Oe are not English diphthongs; they are used in *Æsop, Æneas, Ætna, Cæsar, Œdipus, Œconomy*, and sound like *e*; but in common words they are neglected; as in *equity, female, and tragedy*, though derived of *æquitas, fœmina, and tragedia*.

Of Syllables, and their division, being the art of Spelling.

A Syllable is taking letters together; and uttering them in one breath, as *virtue*; so that *virtue* being thus divided, or taken asunder, makes two syllables, viz. *vir* and *tue*; which put together form the word *virtue*. And many times a vowel, or a diphthong, of themselves, make a syllable; as in *a-bate, e-ve-ry, i-dle, o-ver, u-su-ry*, and in *au-gur, Eu-face, ow-ing, oy-ster, Ea-ton, oa-ton*. No syllable can be made, be there ever so many consonants, or so few, without the aid of a vowel or diphthong.

The longest monosyllables we have in the English, are *length, strength, and streight*, which could not be sounded without the vowel *e* or *i*.

The art of spelling may be reduced to these four following general rules or heads.

1st. When a consonant comes between two vowels, in dividing the words into syllables, the consonant is joined to the latter vowel: as in *stature, nature, deliver, unity, &c.* except compound words which terminate in *ed, en, est, eth, ing, ous*; as *coasted, golden, knowest, knoweth, bearer, dying, covetous, ravenous, and suburbs*.

B

2dly. When



2dly. When two consonants come together in the middle of a word, they are to be parted, if not proper to begin a word; as *number, stranger, fortune*: When the same consonant is doubled in a word, the first belongs to the foregoing the latter to the following syllable, as in the rules above, and in these words *Abba, accord, anno, adder, &c.*

3dly. Consonants that can begin words must not be parted in the middle, as *a-gree, be-stow, re-strain, &c.* not *ag-ree, bes-tow, res-train*. These consonants may begin words. viz. *bl, bi, cb, cr, dr, dw, fl, fr, gb, gl, gr, kn, st, &c.* as *blunt, chew, cry, draw, dwell, flesh, ghost, &c.*

4thly. When two vowels come together, not making a diphthong, they must be divided, as in *vial, valiant, Lionel, duel, cruel, meteor, and Laodicea.*

### Some particular Notes.

*L* is doubled in words of one syllable; as *well, tell, swell, ball, wall, fall, will, bill, mill, &c.* But in words of more than one syllable, the word always terminates with single *l*, as *angel, Babel, burlful, beautiful, dutiful, &c.* Neither must *l* be doubled in *alway, also, although, &c.* But words accented on the last syllable must be excepted from the rule above, viz. *install, recall, inroll, rebell, repell.*

*T* must be used before the termination *ing*; as *buying, lying, tarrying, marrying, paying, slaying, burying, &c.*

The long *f* must never be used at the end of a word, or immediately after a short or small *s*.

*X* should be used instead of *st*, where it appears to have been in the original; as *reflexion, connexion*, rather than *reflection, connection*.

If you cannot write out the whole word at the end of the line, you must break off at the end of a syllable.

thus ————— con-  
demn; not thus — cond-  
emn.

Again, ————— dis-  
charge; not ————— disc-  
harge.

*C* must not be put between two consonants, as *think*, not *thinck*; *thank*, not *thanck*; *brink*, not *brinck*; but if a vowel goes before *c*, you must write *c* before *k*, as *brick, thick, stick, &c.*

*Pb* must be retained in words of a foreign original; as *prophet*, not *profet*.

*The Young Man's best Companion.*

23

Of *S* and *C*. Some people may easily drop into error by mistaken *S* for *C*, as in the beginning of the following words, where *C* hath the perfect sound of *S*, though *C* must undoubtedly be written, viz. in

|           |           |          |        |
|-----------|-----------|----------|--------|
| Ceiling   | Cinnamon  | Cell     | Ceruse |
| Celestial | Ceremony  | Celerity | Centre |
| Civet     | Cellar    | Cypress  | Cinque |
| Certain   | Censure   | Circle   | Cipher |
| Cymbal    | Censor    | Circuit  | City   |
| Cistern   | Cease     | Cement   | Citron |
| Centurion | Celebrate |          |        |

But these words must be written with *S*, viz.

|          |         |          |          |
|----------|---------|----------|----------|
| Science  | Sceptre | Scarcity | Sciatica |
| Schedule | Scheme  | Schism   | Scythian |

The following words should be wrote

| with <i>ti</i> . | with <i>si</i> . |
|------------------|------------------|
| Contention       | Confusion        |
| Action           | Occasion         |
| Contradiction    | Contusion        |
| Attention        | Oppression       |
| Benediction      | Allusion         |
| Apparition       | Ascension        |
| Concoction       | Aversion         |
| Declaration      | Aspersion        |
| Ambition         | Commission       |
| Contrition       | Comprehension    |
| Oration          | Circumcision     |
| Oblation         | Conclusion       |

The following words should be spelt thus,

Passion, not pashion.  
 Fashion, not fashion.  
 Cushion, not cusion.  
 Gloucester, not Gloster.  
 Worcester, not Worster.  
 Salisbury, not Salsbury.  
 Leicester, not Lester.  
 Shrewsbury, not Shrosbery.  
 Carlisle, not Carlile.  
 Westminster, not Westmister.

Another qualification in spelling is rightly to distinguish words of the same sound, though widely different in their sense and signification; such as these that follow, viz.

Names alike in Sound, but different in their Signification.

## A

**A** BEL, Cain's brother  
 Able, to do a thing  
 A bell, to ring  
 Accidents, chances  
 Accidence, a book  
 Acre, of land  
 Acorn, of an oak  
 Achor, a valley of that name  
 Advise, counsel  
 Advice, to counsel  
 Account, esteem  
 Accompt, or reckoning  
 Ale, a drink  
 Ail, trouble  
 All, every one  
 Awl, for shoemakers  
 Alley, a narrow place  
 Ally, a friend or confederate  
 Allay, to give ease  
 Alloy, base metal  
 Altar, for sacrifice  
 Alter, to change  
 Ale-hoof, an herb  
 Aloof, at a distance  
 Allow'd, approv'd  
 Aloud, to speak so  
 Amiss, wrong,  
 A miss, young lady  
 Ant, a pismire  
 Aunt, a father's sister  
 Anchor, of a ship  
 Anker, a rundlet  
 A peal, of bells  
 Appeal, to higher powers  
 Appear, to be seen  
 A peer, a Lord  
 Aray, good order  
 Array, to clothe  
 A rose, to smell to  
 Arose, did arise

Are, they be  
 Air, we breathe  
 Heir, to an estate  
 Arrant, notorious  
 Errand, a message  
 Arrows, to shoot  
 Arras, hangings  
 Harrass, to fatigue  
 A scent, or smell  
 Ascent, a going up  
 Assent, agreement  
 Assistance, help  
 Assistants, helpers  
 Augur, a soothsayer  
 Augre, to bore with  
 Ax, to cut with  
 Acts, of parliament  
 Austere, severe  
 Oyster, a shell fish.

## B

Babel, the tower  
 Babble, to prate  
 Bacon, hog's flesh  
 Baken, in an oven  
 Beckon, to make a sign  
 Beacon, to be fired on a hill  
 Bail, a surety  
 Bale, of goods  
 Bald, without hair  
 Bawl'd, cry'd out  
 Ball, to play with  
 Bawl, to cry aloud  
 Barbara, a woman's name  
 Barbary, in Africa  
 Barberry, a fruit  
 Bare, naked  
 Bear, a beast or to bear  
 Bays, of bay trees  
 Barze, cloth, of Colchester  
 Base, vile  
 Bass, in music

Belly,

tion.

hill

lly,

Belly, part of the body  
 Belie, to speak falsely  
 Be, they are  
 Bee, that makes honey  
 Beer, to drink  
 Bier, to carry the dead on  
 Bell, to ring  
 Bel, an idol  
 Berry, a small fruit  
 Bury, the dead  
 Blue, a colour  
 Blew, did blow  
 Board, a plank  
 Boar'd, a hole  
 Bore, a beast  
 Bore, to make hollow  
 Boor, a country fellow  
 Bold, confident  
 Bow'l'd, at the jack  
 Bolt, the door  
 Boul't, the meal  
 Beau, a fop  
 Bow, to bend, or the bow  
 Bough, of the tree  
 Boy, a lad  
 Buoy, of an anchor  
 Bread, to eat  
 Bred, brought up  
 Breeches, to wear  
 Breaches, broken places  
 Bruit, a report  
 Brute, a beast  
 Burrow, for coney  
 Brough, a corporation  
 By, near  
 Buy, with money  
 Brews, he breweth  
 Bruise, a hurt  
 Brewis, of fat and bread  
 Buss, a fishing vessel  
 Buzz, the noise of a fly  
 C  
 Cain, that killed his brother  
 Can, to walk with

Caen, in Normandy  
 Calais, in France  
 Chalice, a cup  
 Call, by name  
 Cawl, fat or suet  
 Cannon, a great gun  
 Canon, a rule  
 Canon, of a cathedral  
 Capital, great or chief  
 Capitol, a tower in Rome  
 Career, full speed  
 Carrier, of goods  
 Cellar, for liquors  
 Seller, that selleth  
 Censer, for incense  
 Censor, a reformer  
 Censure, to judge  
 Centaury, an herb  
 Century, an hundred years  
 Centry, a sentinel a soldier on  
 guard  
 Char, a fish  
 Chair, to sit in  
 Chare, a job of work  
 Champaine, a wine in France  
 Champaign, a wide field, or  
 summer's expedition  
 Choer, rage or anger  
 Collar, of the neck  
 Collier, of beef or brawn  
 Ceiling, of a room  
 Sealing, with a seal  
 Cittern, for music  
 Citron, a fruit  
 Choir, of a cathedral  
 Quire, of paper  
 Clerk, a clergyman  
 Clerk, of a parish  
 Clause, part of a sentence  
 Claws, of a beast or bird  
 Coat, a garment  
 Cote, for sheep  
 Comb, for the hair  
 Come, hither



|                              |                                          |
|------------------------------|------------------------------------------|
| Commit, to do                | Dieppe, a town in France                 |
| Comet, a blazing star        | Defer, to put off                        |
| Common, usual                | Differ, to disagree                      |
| Commune, to converse         | Derbe, a city of Asia                    |
| Condemn, to death            | Derby, a town in England                 |
| Contemn, to despise          | Desert, merit                            |
| Council, of a king           | Desart, wilderness                       |
| Counsel, advice              | Dew, a falling mist                      |
| Coarse, not fine             | Due, owing                               |
| Course, to be run            | Do, to make                              |
| Cornhill, a street in London | Doe, a female deer                       |
| Cornwall, a county           | Dough, paste                             |
| Cou'd, or could              | Don, a Spanish Lord                      |
| Cud, to chew as beasts       | Done, acted                              |
| Current, a running stream    | Dun, of colour                           |
| Courant, a news-paper        | Dolphin, a fish                          |
| Currants, fruit              | Dauphin, the French King's<br>eldest son |
| Crick, in the neck           | Devices, inventions                      |
| Creek, of the sea or river   | Devizes, a town in Wiltshire             |
| Cousin, a relation           | Doer, that doth                          |
| Cozen, to cheat              | Door, of a house                         |
| Cymbal, a musical instrument | Dragon, a beast                          |
| Symbol, a mark or sign       | Dragoon, a soldier                       |
| Cypress, a tree              | Draught, of liquor                       |
| Cyprus, an island            | Drought, dryness                         |
| Cruse, for oil               | Dolour, grief or pain                    |
| Cruise, by the sea coast     | Dollar, a piece of money                 |
| Cygnet, a young swan,        | Demure, sober                            |
| Signer, a seal               | Demur, stop or doubt                     |
| D                            | E                                        |
| Dane, of Denmark             | Ear, of the head                         |
| Deign, to vouch safe         | E'er, ever                               |
| Dam, stopping water          | Year, twelve months                      |
| Damn, to condemn             | Early, betimes                           |
| Dame, a mistress             | Yearly, every year                       |
| Deaf, dull of hearing        | Earth, the ground                        |
| Dear, of price               | Hearth, of the chimney                   |
| Deer, in a park              | Easter, the festival,                    |
| Deceased, dead               | Eather, a woman's name                   |
| Diseased, sick               | Enter, to go in                          |
| Decent, becoming,            | Inter, to bury                           |
| Descent, going up            | Elder, not the younger                   |
| Dissent, to disagree         | Eldern, a tree                           |
| Deep, low in the earth       |                                          |



|                              |                                      |
|------------------------------|--------------------------------------|
| Eaten, or swallowed          | Fin'd, amerced                       |
| Eaton, a town's name         | Fiend, a devil                       |
| Eminent, famous              | Flea, of the skin, and also a vermin |
| Imminent, over head          | Flee, to escape                      |
| Enow, in number              | Flue, of a chimney                   |
| Enough, in quantity          | Flew, did fly                        |
| Yearn, to pity               | Foul, dirty                          |
| East, the wind               | Fowl, a bird                         |
| Yeast, in making bread       | Francis, a man's name                |
| Envy, or hatred              | Frances, a woman's name              |
| Envoy, a messenger           | Prays, quarrels                      |
| Exercise, labour or practice | Froise, pancake with bacon           |
| Exercise to conjure          | Frize, a sort of cloth               |
| Err, to mistake              | Freeze, with cold                    |
| Er, brother to Onan, son of  | G                                    |
| Extant, in being             | Gall, of a beast                     |
| Extent, distance             | Gaul, France                         |
| F                            | Garden, of herbs                     |
| Fain, desirous               | Guardian, an overseer                |
| Feign, to dissemble          | Genteel, graceful                    |
| Fair, beautiful, or a market | Gentile, a heathen                   |
| Fare, victuals               | Gentle, mild                         |
| Faint, weary                 | Gesture, carriage                    |
| Feint, a pretence            | Jester, a merry fellow               |
| Fourth, in number            | Groan, with grief                    |
| Forth, to go out             | Grown, greater                       |
| Feed, to eat                 | Guilt, of sin                        |
| Fee'd, rewarded              | Gilt, with gold                      |
| Fir, wood                    | Greater, bigger                      |
| Fur, or hair                 | Grater for nutmegs                   |
| Felon, a criminal            | Grave, for the dead                  |
| Fellon, a whitlow            | Greave, armour for the legs          |
| File, of steel               | Guess, to imagine                    |
| Foil, put to the worst       | Guest, one entertained               |
| Fly, as a bird               | Gluttenous, greedy                   |
| Fly, an insect               | Glutinous, sticking as pitch         |
| Filip, with the finger       | Great, large                         |
| Philip, a man's name         | Grate, for coals                     |
| Flower of the field          | Greet, to salute                     |
| Flour, meal                  | Graze, to eat grass                  |
| Floor, of a room             | Grays, a town                        |
| Follow, to come after        | Groat, fourpence                     |
| Fallow, ground not plow'd    | Grot, a cave                         |
| Find, to find any thing      |                                      |

|                                |                               |
|--------------------------------|-------------------------------|
| Galleys, ships with oars       | Home, one's house             |
| Gallows, for criminals         | Whom? what man?               |
| H                              | Holm, holly                   |
| Hare, in the field             | Hoop, for a tub               |
| Hair, of the head              | Whoop, or ho! lo!             |
| Heir, to an estate             | Hugh, a man's name            |
| Harsh, severe                  | Hue, of colour                |
| Hash, minced meat              | Hew, with an axe              |
| Haven, a harbour               | I                             |
| Heaven, a place of happiness   | I, I myself                   |
| Heart, of the body             | Eye, to see with              |
| Hart, in the woods, or an      | Idle, lazy                    |
| overgrown buck                 | Idol, an image                |
| Herd, of cattle                | I'll, I will                  |
| Heard, did hear                | Ile, of a church              |
| Hard, not soft                 | Isle, an island               |
| Here, in this place            | Oil, of olives                |
| Hear, with the ears            | Employ, in work               |
| High, lofty                    | Imply, to signify             |
| Hie, away, make haste          | In, within                    |
| Hoy, a small ship              | Inn, for travellers           |
| Him, that man                  | Incite, to stir up            |
| Hymn, a spiritual song         | Insight, knowledge            |
| Hail, congealed rain           | Ingenious, of quick parts     |
| Hale, the ship                 | Ingenuous, candid             |
| Hall, in a house               | Iron, metal                   |
| Haul, pull                     | Irony, speaking by contraries |
| Heel, of the foot              | Itch, a distemper             |
| Heal, to cure                  | Hitch, to catch hold of       |
| He'll, he will                 | K                             |
| Higher, taller                 | Ketch, a ship                 |
| Hire, wages                    | Catch, to lay hold            |
| His, of him                    | Kill, to slay                 |
| Hiss, as a snake, or to deride | Kiln, for lime                |
| Hoar, frost                    | Kind, good natur'd            |
| Whore, a lewd woman            | Coin'd, money                 |
| Hole, or hollowness            | Knave, dishonest              |
| Whole, entire                  | Nave, of a wheel              |
| Ho! to! to call                | Knight, by honour             |
| Hallow, to make holy           | Night, darkness               |
| Hollow, having a cavity        | Kennel, for dogs              |
| Holy, pious                    | Channel, for water            |
| Wholly, entirely               | L                             |
| Holly, a tree                  | Laid, placed                  |

Lade,

ade, the water  
 lane, a narrow street  
 ain, did lie  
 atin, a tongue  
 atten, tin  
 adder, to ascend  
 ather, made with soap  
 attice, of a window  
 ettuce, a sallad  
 ease, of a house  
 eash, three  
 ces, of wine  
 ese, an old word for lose  
 eeper, that jumpeth  
 eper, one leprous  
 essen, to make less  
 ession, to be read  
 east, smallest  
 est, for fear  
 ethargy, sleepiness  
 iturgy, church service  
 ier, in wait  
 yer, that tells lies  
 imb, a member  
 imn, to paint  
 ine, length  
 oin, of veal  
 iquorish, fond of dainties  
 iquorice, a plant, or its root  
 ow, humble  
 o! behold  
 ose, to suffer loss  
 oose, to let go  
 ower, to let down  
 our, a frown  
 oath, to abhor  
 oth, unwilling  
 M  
 Made, finished  
 Maid, a young woman  
 Main, chief  
 Mane, of a horse  
 Mail, the masculine gender  
 Mail, armour

Manner, custom  
 Manor, a lordship  
 Manure, dung  
 Market, to buy in  
 Mark it, note it  
 Marsh, low ground  
 Mash, for a horse  
 Mesh, for a net  
 Martin, a man's name  
 Marten, a bird  
 Mead, meadow  
 Mede, one of Media  
 Mean, of low value  
 Mein, carriage or aspect  
 Meat, to eat  
 Meet, fit  
 Mete, to measure  
 Message, business  
 Messuage, a house  
 Mews, for hawks  
 Muse, to meditate  
 Mighty, powerful  
 Moiety, half  
 Mile, measure  
 Mail, labour  
 Might, strength  
 Mite, in cheese  
 Moat, a ditch  
 Mote, in the sun  
 Moan, to lament  
 Mpwn, cut down  
 More, in quantity  
 Moor, a black  
 Mower, that moweth  
 Moor, barren ground  
 Mortar, to pound in  
 Morter, made of lime  
 Mole, an animal  
 Mould, to cast in  
 Muscle, a shell fish  
 Muzzle, to cover the mouth  
 N  
 Nay, denial  
 Neigh, as a horse

Neither,

|                             |                            |
|-----------------------------|----------------------------|
| Neither, none of the two    | Pattin, for a woman        |
| Nether, lower               | Patent, a grant            |
| New, not old                | Peer, a lord               |
| Knew, did know              | Pier, of Dover             |
| Naught, bad                 | Peter, a man's name        |
| Nought, nothing             | Petre, salt                |
| Nigh, near                  | Pail, for water            |
| Nye, a man's name           | Pale, countenance          |
| Nice, curious               | Pale, a fence              |
| Niece, a brother's daughter | Pall, for funeral          |
| Not, denying                | Paul, a man's name         |
| Knot, to tie                | Plait, the hair            |
| Note, to mark               | Plate, metal               |
| Note, of one's hand         | Place, room                |
| Nose, of the face           | Plaise, a fish             |
| Knows, perceives            | Parson, of the parish      |
| No, a denial                | Person, any man            |
| Know, to understand         | Pole, for hops             |
| Neal, to harden glass       | Poll, of the head          |
| Kneel, on the knees         | Poel, of water             |
| None, not one               | Pore, with the eyes        |
| Known, understand           | Poor, necessitous          |
| News, tidings               | Pallate, of the mouth      |
| Noose, a snare              | Pallet, a bed              |
| O                           | Palliate, to hide          |
| Oar, of a boat              | Point, a stop              |
| Ore, crude metal            | Pint, half a quart         |
| O'er, over                  | Posey, a nosegay           |
| Off, cast off               | Poesy, poetry              |
| Of, belonging               | Power, mighty              |
| Our, belonging to us        | Pour, as water             |
| Hour, of the day            | Prey, a booty              |
| Oh! alas                    | Pray, to beseech           |
| Owe, in debt                | Profit, gain               |
| One, in number              | Prophet, a foreteller      |
| Won, at play                | Prophecy, a foretelling    |
| Own, to acknowledge         | Prophecy, to foretel       |
| Order, rule                 | Practice, exercise         |
| Ordure, dung                | Practise, to exercise      |
| P                           | Presence, being here       |
| Pair, a couple              | Presents, gifts            |
| Pare, cut off               | Princes, king's sons       |
| Pear, a fruit               | Princess, king's daughters |
| Pain, anguish               | Please, to content         |
| Pane, of glass              |                            |

Pleas,



Pleas, excuses or defences  
Precedent, an example  
President, chief  
Principal, chief  
Principle, the first rule

Q

Quire of paper  
Choir of singers  
Queen, the king's wife  
Quean, a harlot

R

Rack, to torment  
Wreck, of a ship  
Arrack, a strong liquor  
Rain, water  
Reign, of the king  
Rein, of a bridal  
Rays, of the sun  
Raise, lift up  
Raisin, a fruit  
Reason, argument

Race, to run  
Rase, to demolish  
Rice, grain  
Rise, to get up  
Red, in colour  
Read, the book  
Reed, the plant  
Relick, a remainder  
Relict, a widow

Roe, a deer  
Row, the boat  
Right, not wrong  
Rite, a ceremony  
Write, with a pen  
Wright, a wheelwright

Reddish, colour  
Raddish, a root

Rear, set up  
Rere, behind

Arrear, of rent  
Rest, quiet

Wrest, to pervert  
Roof, of a house

Ruff, for the neck,  
Rough, not smooth  
Rie, corn  
Rye, a town in Sussex  
Wry, crooked  
Ring, the bells  
Wring, the hands  
Rhine, a fog  
Rhyme, verse  
Rind, of cheese  
Rode, did ride  
Road, the highway  
Row'd, did row  
Room, part of a house  
Rome, the name of a city  
Roam, to wander  
Rheum, a humour  
Rote, got by heart  
Wrote, did write  
Wrought, did work

S

Savour, taste or smell  
Saviour, that saves  
Satiety, fulness  
Society, company  
Sheep, a beast  
Ship, for the sea  
Sight, view

Cite, to summons  
Site, situation  
Sail, of a ship  
Sale, of goods  
Sea, the ocean  
See, with the eyes  
Seam, in a coat

Seem, appear  
Seen, beheld  
Scene, in a play

Seas, great waters  
Seize, to lay hold of  
Cease, to leave off

Sent, did send  
Scent, a smell  
Shew, to make appear

Shoe,

Shoe, for the foot  
 Sink, to sink down  
 Cinque, five  
 Slight, to despise  
 Sleight, neglected  
 Sleight, of hand  
 Shoar, a prop  
 Shore, the sea coast  
 Sewer, a common drain  
 Shown, view'd  
 Shone, did shine  
 Slow, not quick  
 Sloe, fruit  
 Sew, with a needle  
 Sue, at law  
 Sow, seed  
 So, thus  
 Some, apart  
 Sum, of money  
 Soul, or spirit  
 Sole, a fish  
 Soal, of a shoe  
 Son, of a father  
 Sun, in the firmament  
 Sore, painful  
 Soar, aloft  
 Swore, did swear  
 Sword, a weapon  
 Soar'd, did soar  
 Stare, to look stedfastly at  
 Stair, a step  
 Stile, to get over  
 Style, of writing  
 Sound, whole, firm, also noise  
 Swoon, to faint away  
 Soon, quickly  
 Statue, an image  
 Statute, a law  
 Stature, height  
 Stead, a place  
 Steed, a horse  
 Strait, not crooked  
 Strait, narrow  
 Succour, help

Sucker, a young sprig  
 Spear, a weapon  
 Sphere, a globe  
 T  
 Then, at that time  
 Than, in comparison  
 Tame, gentle not wild  
 Thames, a great river  
 Tear, to rend  
 Tear, of the eye  
 Tare, an allowance in weight  
 Tare, a vetch  
 Tail, of a beast  
 Tale, a story  
 Tiles, for the house  
 Toils, nets  
 Toil, labour  
 There, in that place  
 Their, of them  
 Thorough, complete  
 Throw, a stone  
 Throne, of the king  
 Thrown, as a stone  
 Tide, a flowing water  
 Ty'd, made fast  
 Time, of the day  
 Thyme, an herb  
 Team, of horses  
 Teem, with child  
 To, the preposition  
 Too, likewise  
 Two, a couple  
 Toe, of the foot  
 Tow, to draw,  
 Tow, to be spun  
 Told, as a story  
 Toll'd, as a bell  
 Tour, a journey  
 Tower, of a church  
 V  
 Vacation, leisure  
 Vacation, a calling  
 Veil, a covering  
 Vale, between two hills

Vain, foolish  
Vein, of the body  
Vane, a weathercock  
Value, worth  
Valley, a vale  
Vial, a glass  
Viol, a fiddle

U

Your, of you  
Uwer, a bason  
Ure, practice  
Use, practice  
Use, to be wont

W

Wade, in the water  
Weigh'd in the scales  
Whale, of the sea  
Wail, to lament  
Waist, the midd  
Waste, to spend  
Wait, to stay for  
Weight, heaviness  
Wear, clothes  
Ware, merchandize  
Were, was  
Where, what place  
Weigh, to poise

*Of Stops, Marks, and Points, used in reading and writing  
with their places and signification.*

THESE are of absolute necessity; and great regard ought to be had of them, to avoid confusion and misconstruction, and for the better understanding of what we read and write ourselves; and are likewise of use to others who shall hear us read, or see our writing: they teach us to observe proper distances of time, with the necessary raising and falling of our tone or voice in reading, and the needful stops or marks to be used in writing, that we may understand it ourselves, and that our meaning may not be misunderstood, or misapplied by others.

Stops, or pauses, considered as intervals in reading, are no more than four; though there are other marks to be taken notice of, but to other purposes. The names of the four stops are a *comma*, *semicolon*, *colon*, and *period* or *full stop*; and these to bear to one another a kind of progressional proportion

C

Wey, five quarters  
Whey, of milk  
Weal, good  
Wheal, from scourging  
Wheel, to spin with  
Wield, a sword  
Weald, of Sussex or Kent  
Wen, in the neck  
When, at what time  
White, of colour  
Wight, an island  
Whore, a lewd woman  
Hoar, frost  
Witch, that conjures  
Which, who or what  
Whist, silence  
Wist, knew  
Wood, of trees  
Wou'd, or would

Y

Yea, yes  
Ye, yourselves  
Ewe, a sheep  
Yew, a tree  
You, yourself  
Yarn, made of wool  
Yearn, to pity

portion of time; for the *comma* signifies a stop of leisurely telling one, the *semicolon* two, the *colon* three, and the *period* four—They are made or marked thus;

*Comma* (,) at the foot of a word.

*Semicolon* (;) a point over a comma.

*Colon* (:) two points.

*Period* (.) a single point at the foot of a word.

, *Example of the comma.* There is not any thing in the world, perhaps, that is more talked of, and less understood, than the business of a happy life.

; *Example of the semicolon.* It is not a curse that makes way for a blessing; the bare wish is an injury; the moderation of Antigonus was remarkable.

: *Example of the colon.* A sound mind is not to be shaken by popular applause: but anger is startled at every accident.

. *Example of the period.* It is a shame, said Fabius, for a commander to excuse himself, by saying, I was not aware of it. A cruelty that was only fit for Marius to suffer, Sylla to command, and Cataline to act.

By the examples foregoing, we may easily note, that a *comma* is a note of short stay between words in the sentence and therefore the tenor of the voice must be still kept up—the *semicolon* is a little longer, and the tone of the voice very little abated—The *colon* signifies perfect sense, though not at the end of a sentence: and the voice a little abated, or let fall.—The *period* denotes perfect sense, and the end of the sentence.

? When the question is asked there is a crooked mark made over the period thus? and is called a note of interrogation. *Example* What could be happier than the state of mankind, when the people lived without either avarice or envy? The time of pause for this stop is the same with the *semicolon*.

! If a sudden crying out, or wondering, be expressed, then this mark is made over the full stop, thus! and called a note of admiration or exclamation. *Example.* Oh the astonishing wonders that are in the elementary world!

() If one sentence be within another, of which it is no part then it is placed between two semicircles, or parenthesis, made thus (). *Example.* Pompey on the other side, (that hardly ever spake in public without a blush) had a wonderful sweetness of nature. Again; Of authors be sure to make choice of the best, and (as said before) to stick close to them. Once more; Honour thy father and mother which is the first



first commandment with promise,) that it may be well with  
nce. In reading a parenthesis, the tone must be somewhat  
power, as a thing or matter that comes in by the bye, breaking  
as it were on the main coherence of the period. The time  
equal to a comma, and ought to be read pretty quick, lest  
detain the ear too long upon the more important matter.

*Apostrophe* is a comma, at the head of letters, signifying  
some letter or letters left out for quicker pronunciation, as  
I'll for *I will*, would'st for *wouldst*, shan't for *shall not*,  
e'er for *never*, is't for *is it*, 'tis for *it is*, i'th for *in thee*, o'er  
or *over*; or to denote a genitive case, as my father's house,  
my uncle's wife, &c.

*Accent* is placed over a vowel, to denote that the stress or  
pound in pronunciation is on that syllable.

*Breve*, or crooked mark over a vowel signifies it must be  
pounded short or quick.

*Caret* signifies that something is wanting and is placed un-  
derneath the line, just where any thing omitted by mistake  
and forgetfulness &c. should be brought in.

*Circumflex* is of the same shape with the caret, but is pla-  
ced over some vowel, to shew the syllable to be long, as *Eu-  
brates*.

*Dialysis*, or *Diaræsis*, or two points placed over two  
vowels, in a word, signifies they are to be parted, being no  
diphthong.

*Hyphen*, or *Note of connection*, is a straight line: which  
being set at the end of the line, shews that the syllables of  
that word are parted, and the remainder of it is at the begin-  
ning of the next line; and sometimes is used in compound  
words as burnt-sacrifices, heart-breaking, soul healing, book-  
keeper, &c. N. B. That when you have not room to write the  
whole word at the end of the line, but are obliged to finish  
it at the beginning of the next, such words must be truly  
divided, according to the rules of spelling; as re-strain, not  
res-train. When the hyphen is placed over a vowel, it is  
properly a dash, and signifies the omission of *m* or *n*; it is  
much used in old *Latin* authors, and sometimes in *English*.

especially in law business. *Example*, it is very commend-  
able to write a good hand.

*Index* is a note like a hand, pointing to something  
very remarkable.

*Asterism* or *star*, directs to some remark in the margin,  
or the foot of a page. Several of them together denote  
something

something defective or immodest, in that passage of the author.

† *Obelisk*, is a mark like a dagger, and refers to the margin; as the asterism: And in dictionaries it signifies the word to be obsolete, or old, or out of use.

¶ *Paragraph*, denotes a division, comprehending several sentences under one head.

§ *Section* signifies the beginning of a new head or discourse, and is used in sub-dividing a chapter, or book, into lesser parts or portions.

[] *Brackets*, or *Crotchets*, generally include a word or sentence explanatory of what went before; or words of the same sense, which may be used in their stead.

“ *Quotation*, or double comma, reverse, is used at the beginning of the line, and shews what is quoted from an author, to be his own words.

Thus much for pointing, stops and marks; which if carefully heeded and observed, will add grace and credit to your writing.

*Cf Abbreviations.*

**T**O be ready in these, shews a dexterity in writing; and is very necessary for dispatch; for by these we expeditiously express, or set down a word, shortening it, by making some initial letter or letters, belonging to the word to express it; as in the Table following.

|                                       |                                                    |
|---------------------------------------|----------------------------------------------------|
| A. for Answer or Afternoon            | A. R. Anno Regni in the Year of the Reign          |
| Abp. Archbishop                       | Ast. P. G. Astronomy, Professor at Gresham College |
| A. B. Arts Batchelor                  | Aust. Austin, or Austria                           |
| Acct. Account                         | B. A. Batchelor of Arts                            |
| A. D. Anno Domini, Year of our Lord   | B. D. Bachelor of Divinity                         |
| A. M. Anno Mundi, Year of the World   | B. V. Blessed Virgin                               |
| Admrs. Administrators                 | Bart. Baronet                                      |
| A. M. Artium Magister, Master of Arts | Bp. Bishop                                         |
| Ana. of each a like quantity          | Cant. Canticles, or Canterbury                     |
| Ap. April, or Apostle                 | Cat. Catechism.                                    |
| Adml. Admiral                         | Cha. Charles                                       |
| Agt. Against                          | Chap. Chapter                                      |
| Amt. Amount                           | Cent. Centum                                       |
| Anab. Anabaptist                      | Chanc. Chancellor                                  |
| Aug. August                           | Chron. Chronicles                                  |
|                                       | Capt. Captain                                      |

|                                                        |                                                       |
|--------------------------------------------------------|-------------------------------------------------------|
| Clem. Clement                                          | Expos. Exposition                                     |
| Col. Colossians                                        | Esq. Esquire                                          |
| Cl. Clericus                                           | Exon. Exeter                                          |
| Co. Country, or Company                                | Fr. French, or France                                 |
| Col. Colonel                                           | Feb. February                                         |
| Comrs. Commissioners                                   | Era. Francis                                          |
| Con. Constance or Constantine                          | F. R. S. Fellow of the Royal Society                  |
| Conf. Confessor                                        | Gal. Galatians                                        |
| Cor. Corinthians or Corolary                           | Gen. Genesis                                          |
| Cr. Creditor                                           | Genmo. Generalissimo                                  |
| C. R. Carolus Rex, or Charles the King                 | Geo. George                                           |
| C. C. C. Corpus Christi College                        | G. R. Georgius Rex, George the king                   |
| C. S. Custos Sigilli, Keeper of the Seal               | Gar. Garrison                                         |
| C. S. Custos Privati Sigilli, Keeper of the privy Seal | Gen. General                                          |
| D. Dean or Duke                                        | Gent. Gentleman                                       |
| Dan. Daniel                                            | Gosp. Gospel                                          |
| Dr. Doctor, or Debtor                                  | Greg. Gregory                                         |
| Dea. Deacon                                            | Hen. Henry                                            |
| Do. Ditto or the same                                  | Hamp. Hamper                                          |
| D. Denatii, Pence                                      | Hund. Hundred                                         |
| Dec. or <i>xber</i> , or <i>rober</i> , December       | Hum. Humphrey                                         |
| Devon. Devonshire                                      | Heb. Hebrews                                          |
| Deut. Deuteronomy                                      | i. e. id est, that is                                 |
| Dec. Deceased                                          | J. H. S. Jesus Hominum Salvator, Jesus Saviour of Men |
| D. C. Dean of Christ Church                            | Ibid. ibidem, in the same                             |
| Doct. Doctrine                                         | Id. Idem, the same [place                             |
| D. D. Doctor of Divinity                               | Inst. Instance, or Instant                            |
| E for Earl                                             | Ja. James, or Jacob                                   |
| Earld. Earldom                                         | Jan. January                                          |
| Edm. Edmund                                            | Jer. Jeremiah                                         |
| Edw. Edward                                            | Jes. Jesus                                            |
| Ex. gr. Exempli gratia for example                     | Jno. John                                             |
| Engl. England                                          | Jud. Judges                                           |
| Elis. Elizabeth                                        | Is. Isaac, or Isaiah                                  |
| Eph. Ephesians                                         | J. D. Jurium Doctor, Doctor of laws                   |
| Ecl. Ecclesiastes                                      | Jes. Joshua                                           |
| Ex. Exodus or Example                                  | K. King                                               |
| Ev. Evangelist                                         | Kim. Kingdom                                          |
| Expl. Explanation                                      | Ku. Knight                                            |
|                                                        | Ld. Lord                                              |

|                              |                                 |
|------------------------------|---------------------------------|
| L. Liber, a book             | Obt. Obedient                   |
| L. Libra a Pound             | O. W. Old World                 |
| Lieut. Lieutenant            | O. S. Old Style                 |
| Lp. Lordship                 | Oct. or 8ber October            |
| Lyp. Ladyship                | Oxon. Oxford                    |
| L. L. D. Legum Doctor        | P. Paul, Paulus, Publius, or    |
| Doctor of laws               | President                       |
| Lond. London                 | Pugil. and a Handful            |
| Lr. Letter                   | Pen. Penelope                   |
| Lam. Lamentations            | Pd Paid                         |
| Lev. Leviticus               | Par. Parish                     |
| L. C. J. Lord Chief Justice  | Pr. Per or by                   |
| M. Marquis, or Monday, or    | Pat. Patience, or Patrick       |
| Morning                      | Per. C. Per Centum, by the      |
| Mar. March                   | Hundred                         |
| Mat. Matthew                 | Parl. Parliament                |
| M. Manipulus a handful       | Pet. Peter                      |
| M. A. Master of Arts         | Phil. Philipians, or Philip     |
| Maty. Majesty                | Philo. Math. Philo Mathematic   |
| Md. Madam                    | ticus, a lover of the Ma        |
| Mons. Monsieur               | thematics                       |
| Math. Mathematician          | P. M. G. Professor of Music     |
| Mr. Master                   | at Gresham College              |
| Mrs. Mistress                | Prof. Th. G. Professor of Di    |
| M. D. Medicinæ Doctor        | vinity at Gresham College       |
| Doctor of Physic             | Priso. Pri Jcilli               |
| M. S. Manuscript             | Pr. Priest, or Prince           |
| M. S. S. Manuscripts         | Ps. Psalm                       |
| M. S. Memoria Sacrum         | P. S. Postscript                |
| Sacred to the Memory         | Penult. last save one           |
| Mich. Michael, or Michaelmas | Q. Queen, Query, or Question    |
| Min. Minister                | Q. Quasi, as it were            |
| N. Nore                      | Q. D. Quasi dicat, as if he     |
| Na. Nathaniel, or Nativity   | should say                      |
| N. B. Nota Bene, Note, or    | q. l. Quantem libet, as much    |
| mark well                    | as you please                   |
| Nic. Nicholas, or Nicodemus  | q. s. Quantum sufficit, a suffi |
| N. S. New Style              | cient quantity                  |
| No. Number                   | Qr. Quarter, or a Farthing      |
| N. L. Non. Lique, it ap      | R Reason                        |
| pears not                    | R. Rex, King, or Regina         |
| Nov. or 9ber, November       | Queen                           |
| O. Oliver                    | Rev'd. Reverend                 |
| Object. Objection            | Rev. Revelation                 |



|                                                   |                                                  |
|---------------------------------------------------|--------------------------------------------------|
| Rich. Richard                                     | To. Tobias                                       |
| Rob. Robert                                       | V. Virgin, or verse                              |
| Rog. Roger                                        | U. Use                                           |
| Ret. Return                                       | Ult. } the last                                  |
| Reg. Prof. Regius Professor                       | Ultimus                                          |
| Rom. Romans                                       | Vid. See                                         |
| Rt. Hon. Right Honourable                         | Ven. Venerable                                   |
| Rt. Wor. Right Worshipful                         | Viz. Videlicet, to wit, or<br>that is to say     |
| St. Saint                                         | V. gr. Verbi gratia, for ex-<br>ample            |
| Sam. Samuel                                       | Wm. William                                      |
| Sect. Section                                     | Wp. Worship                                      |
| Sept. or 7ber September                           | Wpl. Worshipful                                  |
| Serj. Serjeant                                    | W. R. William Rex                                |
| Ser. Servant                                      | wn. when                                         |
| Shr. Shire                                        | Xn. Christian                                    |
| Salop. Shropshire                                 | Xt. Christ                                       |
| Sol. Solution                                     | Xtopher. Christopher                             |
| Staff. Stafford                                   | ye, the                                          |
| Sp. Spain, or Spanish                             | yn. then                                         |
| Sr. Sir                                           | ym. them                                         |
| Ss. Semisses, half a pound                        | yt. that                                         |
| S. S. T. P. Professor, or a<br>Doctor of Divinity | yr. your                                         |
| Stew. Steward                                     | & et, and                                        |
| Tho. Thomas                                       | &c. et cetera and the rest, or,<br>and so forth. |
| Thess. Thessalonians                              |                                                  |
| Theo. Theophilus                                  |                                                  |

And now having finished my directions concerning spelling; pointing, &c. I shall proceed to give some instructions in relation to the most useful art in writing.

When any person has thoroughly acquainted himself with spelling, and understands good English, &c. the next step necessary is the acquiring of the accomplishing art of fair writing, to put this spelling in practice: in order thereto, I shall endeavour to give such directions, and proper instructions, as may duly qualify any person therein.

First, and principally, there must be fixed desire and inclination imprinted in the mind for attainment: For I myself had never acquired, or arrived to a proficiency in it, if I had not had a strong desire and inclination to it; arising from being convinced of its excellent use in trade and all manner of business, according to the verse.

*Great*

*Great was his genius, most sublime his thought,  
That first fair writing to perfection brought, &c.*

Next to the desire, there must be added a steady resolution to go through with it till it is gained; and by diligent and indefatigable application, overcome all seeming difficulties that may arise in the progress of its attainment, agreeable to this distich.

*By frequent use experience gains its growth  
But knowledge flies from laziness and sloth.*

#### DIRECTIONS to BEGINNERS in WRITING.

**F**IRST, you must be provided with the following implements, viz. good Pens, good and free Ink, also good Paper, when arrived to commendable Performances; likewise a flat Ruler for Sureness, and a round one for Dispatch; with a leaden Plummets or Pencil to rule Lines: Also Gum-Sandrick Powder (or Pounce as they call it,) with a little cotton dipt therein, which rub gently over the paper to make it bear Ink the better; particularly when all hands are to be written, such as Text, &c. and especially when you are obliged to scratch out a Word or Letter; for then there will be a necessity for its use; and rubbing the place with the Pounce, smooth it with the hilt of the Penknife, or clean Paper, and then you may write what is proper in the same Place. The Implements are surnamed in these Lines:

*A Penknife, Razor, Metal, Quills good store;  
Gum-Sandrick Powder to pounce Paper o'er;  
Ink, shining black, Paper more white than Snow,  
Round and flat Rulers on yourself bestow.  
With willing Mind, these and industrious Hand,  
Will make this Art your Servant at Command.*

#### *To hold the Pen.*

**T**HE Pen must be held somewhat sloping, with the Thumb and the two Fingers next to it; the Ball of the middle finger must be kept strait just against the upper bar of the cut or cradle, to keep the Pen steady: The Fore-finger lying strait on the middle finger, and the Thumb must be fixed a little higher than the end of the Fore-finger, bending in the Joint; and the Pen be so placed as to be held easily without gripping. The elbow must be drawn towards the body; but not too close. You must support your Hand, by leaning on the Table edge, resting on it half way between your wrist and elbow, not suffering the Ball, or fleshy part of your Hand to touch the Paper; but resting your Hand on the end of your little finger, that and your

fourth

fourth finger bending inwards, and supported on the Table as above said. So fixed, and sitting pretty upright, not leaning your breast against the table, proceed to the making the small *o*, the *a*, and *u*, *e*, *i*, *m*, *r*, *f*, *w*, and *x*; which must all be made of equal bigness and height; the distance or width between the two strokes of the *n*, must be the same with the distance or width of the three strokes of the *m*, the same proportion or width must be observed in the *u*, *w*, *o*. The letters with Stems or Heads, must be of equal height; as the *b*, *d*, *f*, *h*, *l*, and *j*. And those with Tails must be of equal depth, as *s*, *g*, *p*, *q*, *z*. The capitals must bear the same proportion to one another in Respect to the bigness and Height; as *A*, *B*, *C*, *D*, *E*, *F*, *G*, *H*, and *I*, &c. This Proportion of Letters, both of small and great, must be observed in, and will serve for all hands whatsoever. — *N. B.* That all upright Strokes, and those leaning to the left Hand, must be finer or Hairstrokes, and all downright strokes must be fuller or blacker. And when you are in joining, where letters will naturally join, without any straining, take not off the Pen in Writing, especially in running or mixed hand; Care likewise must be duly taken, that there is an equal distance between Letter and Letter, and also between Word and Word, the Distance between Word and Word, may be the space the small *m* takes up; but between Letter and Letter, not quite so much. Sit not long at writing, (that is not longer than you improve) especially at first, lest it weary you, and you grow tired of learning. Imitate the best examples, and have a constant eye at your Copy: and be not ambitious of writing-fast, before you can write well: Expedition will naturally follow, after you have gained a habit of writing fair and free; and it is much more commendable to be an Hour in writing six lines well, than to be able to write sixty Lines in the same time, which perhaps will be altogether unintelligible. And besides, by a slow and fair Procedure, you learn in half the Time; and therefore 'tis a vain Thought in a Learner to desire to be quick before he hath acquired Experience, and a Freedom of writing by frequent Practice. If you have Cotton in your Ink, look well that there be no hairs at the Nib of your Pen. Never overcharge your Pen with Ink, but shake what is too much into the Ink hold again.

*How to make a Pen.*

**T**HIS is gained sooner by Experience and Observation from others that can make a Pen well, than by verbal Directions

**Directions.** But Note, that those Quills called seconds are the best, as being hard, long and round in the Barrel; and before you begin to cut the Quill, scrape off the superfluous scrum with the back of your penknife: scrape most on the back of the quill, that the slit may be the finer, and without ganders teeth (as the roughness in the slit is by some called.) After you have scraped the quill as above said, cut the quill at the end, half through on the back part; and then turning up the belly, cut the other half or part quite through, viz. about a quarter or almost half an inch at the end of the quill, which will then appear forked; then enter the penknife a little in the back notch, and then putting the peg of the penknife haft (or the end of a quill) into the back notch, holding your thumb pretty hard on the back of the quill, (as high as you intend the slit to be) with a sudden or quick twitch force up the slit: it must be sudden and smart, that the slit may be the clearer. Then, by several cuts on each side, bring the quill into equal shape or form on both sides; and having brought it to a fine point; place the inside of the nib on the nail of your thumb, and enter the knife at the extremity of the nib, and cut it through, a little sloping; then, with an almost downright cut of the knife, cut off the nib; and then by other proper cuts finish the pen, bringing it to an handsome shape, and proper form; but meddle not with the nib again, by giving it any trimming or fine cuts, for that causes a roughness, and spoils it; but if you do, to bring the nib the evener, you must nib it again as above directed.

**Note,** That the breadth of the nib must be proportioned to the breadth of the body, or downright back strokes of the letters, in whatsoever hand you write, whether small or text.

**Note also,** That in your sitting to write, you place yourself directly against a fore-right light, or else to have it on your left hand, (which I esteem best) but by no means to have it on your right hand, because the shadow of your writing hand will obstruct your sight.

Thus far for direction. Now for application. I have here set copies of the most usual, fashionable, and commendable hands for business; with alphabets of great and small letters proper to each. Be sure you make your letters well, (both small and great,) before you proceed to joining. Be careful in imitation, and observe the foregoing directions, and without doubt you will gain your end. Command of hand, or the art of striking letters, &c. is gained by frequent practising after good examples.



A B C D E F G H I J K L M N O

P Q R S T V U W X Y Z.

a b c d e f g h i j k l m n o p q r f

s t v u w x y z.

Now, 'Tis necessary for all those who would qualify themselves for business, often to imitate this print hand; to make clean marks on bales, or plain directions on parcels.

COPIES

*COPIES in Alphabetical Order.*

## A

**A**RT is gained by labour and industry.  
 A covetous man is always, as he fancies, in want.  
 Add to your faith virtue, and to virtue knowledge.  
 A blind man's wife, they say, needs no painting.  
 A comely countenance is a silent commendation.  
 A place of ill example may endanger a good man.  
 A prudent man values content more than riches.  
 A virtuous man is rather to be chosen than promotion.  
 A fair piece of writing is a speaking picture.  
 All worldly things run a continual round.  
 Authority is the main point in government.  
 All God's commandments are divinely pure.  
 A man's manners commonly form his fortune.  
 A great liar is seldom believed though he speaks the truth.  
 All evil things and vain, strive ever to refrain.  
 A virtuous minded youth, will ever love the truth.  
 A prudent youth and wise, will not advice despise.  
 All you that would write well, strive others to excell.  
 Abundance ruins some, but want makes all to moan.  
 Amendment still should shine, in all and every line.  
 A greater loss can't be, than that of liberty.  
 A good and virtuous lad, will shun what'er is bad.  
 Affectation renders the fairest face disagreeable.  
 All idleness avoid, by it most are destroy'd.  
 All idle lazy boys, obstruct their parents joys.  
 A man by conduct may keep misery away.  
 All mishap hath been occasioned by our sin.  
 Avoid the occasion still of running into ill.  
 A youth that would transcend, must ever mind to mend.  
 A lad that would excel, must mind his copy well.

## B

Bounty is commendable in some, but it ruins others.  
 By commendable deportment we gain reputation.  
 By delight, and some care, we come to write fair.  
 By diligence and industry we come to preferment.  
 Beauty without virtue is but a painted sepulchre.  
 Beauty commands some, but money all men.  
 By constant amendment, we rise to preferment.  
 Brave men will do nothing unbecoming themselves.  
 Be wise and beware, of blotting take care.

Bounty

ounty is more commended than imitated.  
by iniquity and sin, misfortunes enter in.  
by idleness and play, youth squander time away.  
barren are those joys, we waste away in toys.  
blessed are their joys above, who do their time improve.  
badness brings all sadness, therefore follow goodness.  
by trusting till to morrow, men plunge themselves in sorrow  
the wise betimes, shun darling crimes.

C

Contentment is preferable to riches and honour.  
Can they be counted wise, who counsel do despise.  
Are mixed with delight, will bring us soon to write.  
Consider the shortness of life, and certainty of death.  
Contentment is a gem beyond a diadem.  
Competency with content is a great happiness.  
Contention and strife make uneasy our life.  
Courtiers receive presents in a morning and forget them by  
caution and care oft baffle a snare. [night,  
Contentment makes a man happy without a fortune.  
Ensure no man, nor detract from any man.

D

Deride not infirmities, nor triumph over injuries.  
Delight with some care, will make you write fair.  
Delight in virtue's ways, and then you'll merit praise.  
Death conquers potent princes, and their powers.  
Delight in what you undertake to learn. [man's back.  
Death is before the old man's face, and may be at the young  
Duty, fear, and love, we owe to God above.  
Drinking is the drowning of cares, not the cure of them.  
Death only can declare, what dust the bodies of all mortals are  
Death destroys not the soul, but an ill life does.  
Do unto others as you would that they unto you should.  
Delay is the remora to all good success.  
Deprive no person of his lawful due, lest they should do the  
Delight and pleasure is but a golden dream. [same by you.  
Death is less fear'd by a fool than a philosopher.

E

Endless joys have those, whose sins are vanquish'd foes.  
Every plant and flow'r, shews to us God's power.  
Example oft doth rule, the wise man and the fool.  
Examples oft prevail, when arguments do fail.  
Every idle thought to judgment must be brought.  
Every sluggard is the cause of his own misfortune.  
Envious men do fret, when they see others get.

D

Evil

Evil company makes the good bad, and the bad worse.  
 Experience is the best looking-glass of wisdom.  
 Even at head and feet, be sure your letters keep.  
 Endeavour to do well, and then you may excel.  
 Every man is right, that mixes profit with delight.  
 Evil men and sly, take care how you come nigh.  
 Envy and care make the body grow spare.  
 Every money'd man hath others at command.

## F

Fair words are often used to hide foul deeds.  
 Fair faces have sometimes foul conditions.  
 Few do good with what they have gotten ill.  
 Future events must be left to providence.  
 Fools are ruled by their humour, but wise men by interest.  
 Firm keep your mind on things that are sublime.  
 Fear is a good watchman, but a bad defender.  
 Fate will still have a kind chance for the brave.  
 Fraud in childhood will become knavery in manhood.  
 Fear without hope turns to despair.  
 Faith and hope are both dead when divided.  
 Fortune is kind at some hours to all.  
 Feign'd looks oft hide what the false heart doth know.  
 Fortune and fame create a great name.  
 Friends in adversity are not often found.  
 Fools and knaves are not companions for honest men.  
 Frugality and industry are the two hands of fortune.

## G

Godliness with contentment is great gain.  
 Good manners in a lad, will make his parents glad.  
 Great minds, and small means, ruin many men.  
 Good manners, grace, and truth, are ornaments in youth.  
 Good men as well as bad, have sometimes fortunes sad.  
 Great good you sure will find, if you are well inclin'd.  
 Good humour hath never failing graces.  
 God's works only are perfect in their kind.  
 Gluttony would ransack Noah's ark for the riot of a meal.  
 Grief nourished in your breast, will never let you rest.  
 Greater profit doth always come of learning than of play.  
 Great men though they should, are not always good.  
 Good men are safe when wicked ones are at odds.  
 Get what you get honestly, and use it frugally.  
 God is omnipresent, true, and almighty.

## H

Hasty resolutions are seldom fortunate,



ste makes waste of paper, ink, and time.  
e that stumbles and falls not, amends his pace.  
honour and renown will the ingenious crown,  
ypocrites first cheat the world and at last themselves.  
uman life will human frailties have.  
honour that is true, 'tis lawful to pursue.  
e that sends a fool of an errand ought to follow him.  
honours are burthens, and riches have wings.  
e is a wise security who secures himself.  
e that sins against conscience, sins with a witness.  
honour the hoary head, that virtue's path doth tread.  
appy are their joys, who turn away from toys.  
ours fly swift away, improve each moment in the day.  
e that swims in sin, must sink in sorrow.  
e that fears not an oath, will not tremble at a lie.  
e hath his work half done, that hath it well begun.

I

struction and a good education are a durable portion.  
ignorance is the greatest enemy to learning.  
n praising sparing be, and blame most sparingly.  
maginary toys, do please some idle boys.  
temperance is attended by diseases, and idleness by want.  
is good to have a friend, but bad to need him.  
illness and sloth interrupt learnings growth.  
nnocence need not fear the lion, nor the rugged bear.  
t is better to be unborn, than untaught.  
t is too late to spare, when the bottom is bare.  
dleness hath no advocate, but many friends.  
mprovement of parts, is by improvement of time.  
f you'd win a pen of gold, first learn well the pen to hold.  
t is the work of an age, to repair the misconduct of an hour.

K

Keep a close mouth, if you would have a wise head.  
Kings as well as mean men must die.  
Kings may command, and subjects must obey.  
Kingdoms and crowns must in the dust be laid.  
Knowledge sublime, is gained by much time.  
Keep at a distance from the company that's ill.  
Keep good decorum in your words and deeds.  
Keep close your intention, for fear of prevention.  
Kings may win crowns, but cannot conquer death.  
Keep faith with all men, and have a care of a lie.  
Keep good company, if you'd keep a good name.  
Knowledge if abus'd, is like a gem ill us'd.

D

Kingdoms

Kingdoms bring care, and crowns are heavy things to wear.  
 Keep out evil thoughts by entertaining good ones.  
 Kind actions neglected, make friendship suspected.  
 Keep safe good counsel, and entertain not ill advice.  
 Kindle not passions fire, it burns with dreadful ire.

## L

Learn to live as you would wish to die.  
 Love and honour will bear no rivals.  
 Learn to unlearn what you have learnt amiss.  
 Learn now in time of youth, to follow grace and truth.  
 Liberty is grateful to all, but destructive to any.  
 Lying is the duty of none, but the custom of many.  
 Learning do but love, and then you will improve.  
 Liberality without discretion becomes profuseness.  
 Let no jest intrude upon good manners.  
 Learn now in youthful prime to husband well your time.  
 Liberality should have no other object but the poor.  
 Lost opportunities are very rarely, if ever recovered.  
 Let not the work of to-day, be put off till to-morrow.  
 Laugh not out of measure, nor out of season.

## M

Modesty has more charms than beauty.  
 Monuments of learning are most durable.  
 Many know good, but do not the good they know.  
 Make use of time, now you are in your prime.  
 Money commonly corrupts both church and state.  
 Many think not of dying, till they can live no longer.  
 Many have repented talking, few of being silent.  
 Man has much to learn, but a short time to live.  
 Measure not goodness by good words only.  
 Marriage is out of season if we are either too young or too old.  
 Most precious time esteem, which no one can redeem.  
 Many live beggars all their lives that they may not die so.  
 Money makes some men mad, many merry, but few sad.  
 Many are led by the ears, more than by the understanding.  
 Most precious things are still possess'd with fear.  
 Many are made saints on earth that never reach heaven.  
 Malice seldom wants a mark to shoot at.  
 Misfortune is the touch-stone of friendship.  
 Make no friendship with an angry man.  
 Many things happen between the cup and the lip.  
 Mend your manners, and that will mend your fortune.  
 Many want help, that have not the face to ask it.  
 Momentary and vain is all earthly gain.

Nothing

N

Nothing is constant in this uncertain world.  
Necessity is commonly the mother of invention.  
Next to a good conscience prefer a good name.  
None so high can be, as no mishap to see.  
Nothing is so difficult but diligence may overcome.  
No task is too hard when heaven's the reward.  
None can lay himself under an obligation to do ill.  
Never lament and weep, for loss of what you cannot keep.  
None advise or talk without some rule, declares a man to be a fool.

O

Opportunity neglected brings severe repentance.  
Our present time depends our future state.  
Of all prodigality that of time's the worst.  
Of what gives most delight, we soonest lose the sight.  
Of committing to do good, is committing evil.  
Orators are more solicitous to speak *well*, than to do so.  
Our life is but here a journey to the next world.  
Our sand doth run apace, and soon we end our race.  
Our minds must be cultivated as well as our plans.  
Other peoples deaths ought to be remembrances of our own.  
Our early care should be to live most piously.  
Our time of life is call'd a span, by which observe how frail  
is man.

One vice is more expensive than ten virtues.

P

Provide against the worst, and hope for the best.  
Poor men want many things, but covetous men all.  
Patience and time run through the roughest day.  
Put to your tongue a bridle, that it talk not idle.  
Pain, disgrace, and poverty have frightful looks.  
Prayers and provender hinder no man's journey.  
Put not off the main business of life, to the very article of death.  
Pain we can count, but pleasure steals away.  
Poor freedom is better than rich slavery.  
Pursue useful and profitable studies.  
Passion and partiality govern in too many cases.  
Perfection in this world is virtue, and in the next knowledge.

Q

Quick promisers are commonly slow performers.  
Quietness and content, are mates most excellent.  
Qualify exorbitant passions with quietness and patience.  
Quiet men have quiet minds, and enjoy content.  
Quickening learning with alacrity and delight.

D 3

Quarrelsome

Quarrelsome persons often meet with their match.  
 Quarrels are more easily begun than ended.  
 Quietness is secure, but rashness is dangerous.  
 Quietly learn to bear a cross; if we repine 'tis to our loss.  
 Questions in jest no serious answers need.  
 Quench passions heat, don't suffer it to reign.  
 Quantity with some, is what they'd hit: but quality prevails  
 with men of wit.

## R

Remember your duty to God, your neighbour, and yourself.  
 Repentance comes too late, when all is consumed.  
 Reason should always guide, and o'er each act preside.  
 Reputation should be the darling of human affections.  
 Rest continued long, makes idleness grow strong.  
 Rely on virtue more than blood.  
 Repent to-day, to morrow may be too late.  
 Reputation is like a glass, when crack'd it cannot be mended.  
 Reputation is gained by many actions, and lost by one.  
 Remember death, and do not forget judgment.  
 Religion in hypocrites is but skin deep.  
 Relations and friends pursue their own ends.  
 Religion is best understood when most practised.  
 Riches serve a wise man, and rule a fool.  
 Run no great risque for 'vantage small, tho' some for money  
 Revenge is pleasure only to a mean spirit. [hazard all.  
 Righteous men's prayers will be regarded.  
 Repentance is a quite forsaking sin, but he repents not that  
 remains therein.

Resolve to amend, and pursue to your end.  
 Review the time you have mispent, think upon it and lament  
 Recreation should fit us for business, not rob us of time.

## S

Sin and sorrow are inseparable companions.  
 Self love is the greatest flatterer in the world.  
 Some would rather discharge a reckoning than pay a debt.  
 Sin is the certain cause of misfortune.  
 Study to live quiet, and to do your own business.  
 Some in their zeal are hot, but knowledge they have not.  
 Set bounds to zeal by discretion.  
 Silence is the sanctuary of prudence and discretion.  
 Sloth is an argument of a mean degenerate mind.  
 Short, and therefore vain, is all earthly gain.  
 Soft words sometimes work upon the proudest heart.  
 Sleep and idleness are enemies to learning.



Sin is the cause of shame, who love it are to blame.  
Small means and small minds ruin many men.  
Short are all extremes, whether of good or ill.  
Spend time in good duties, and treasure in good works.  
Some go fine and brave, finely to play the knave.  
Six feet of earth end all distinctions of our birth.  
Some must die, that others may live, said the grave digger.  
Silly people are commonly pleased with silly things.  
Some are full of oral sanctity, and mental impiety.  
Some profit comes from all ungodly gains.

T

Train up a child in the practice of love and good manners.  
The end of mirth is many times the beginning of sorrow.  
Time is so swift that none can overtake it.  
Time passeth swift away, no mortal can make it stay.  
Time passeth swift away, improve therefore each day.  
The doing nothing is very near the doing evil.  
Those who won't mend to-day, shall have more work to-morrow.

The borrower is a slave to the lender; and the surety a slave to both.

Trust is the strongest band of human society.  
The endowments of the mind ought not to be confin'd.  
Truth may be blam'd, but cannot be sham'd.  
Trust not too far, nor mistrust too soon.  
The city cares not what the country thinks.  
To do good is the way to find it.  
'Tis just so much time lost as is idly spent.  
There is no such thing in nature as perfection.  
Time, tide, and carriers, will for no man stay.  
The unfortunate are insulted by every rascal.  
'Tis inhuman to sport with another's infirmities.

V

Vanity makes beauty contemptible.  
Vain and transitory is all worldly glory.  
Virtue and fortune work wonders in the world.  
Value more a good conscience than great fame.  
Unwilling go to law, and willingly make an end.  
Understanding a thing is half doing it.  
Variety is the happiness of life.  
Virtuous and brave actions gain reputation.  
Use soft words and hard arguments.  
Virtue is commended by all, but followed by few.

Unthankfulness

Unthankfulness is the cause of the earth's unfruitfulness.  
 Vain conceitedness is ridiculed by all.  
 Virtue is seldom a match for power.  
 Understand things not by their form, but quality.  
 Virtue all commend, but few do it attend.  
 Union and peace make discord cease.  
 Valour and greatness are prefer'd before neatness.  
 Vain and foolish things, disreputation brings.  
 Virtuous actions will bring reputation still.

## W

What is more vain than public light to shun.  
 What pleases God must be; none alters his decree.  
 We are many times deceived with the bare shew of good.  
 Women and wine, though they smile, make men pine.  
 When fortune knocks, be sure to open the door.  
 Wine is a turn coat; first a friend and then an enemy.  
 What is violent is seldom permanent.  
 When good cheer is lacking, our friends will be packing.  
 Wise men keep their expences short of their income.  
 We keep a better account of our money than our time.  
 Wickedness in jest, turns to wickedness in earnest.  
 We must not blame fortune for our own faults.  
 Where knavery is in credit, honesty is put out of countenance.  
 We must look to time past, to improve what's to come.  
 What is fixed in our hearts is seldom out of our heads.  
 Wickedness comes by degrees as well as virtue.  
 Would you be rich, be industrious; if wise, studious.

## X

*Xenophon* was a great captain, as well as great philosopher.  
*Xerxes* wept at the thoughts that his vast army would be  
 dead in 100 years.  
*Xerxes* whipt the sea because it would not obey his command.  
*Xenophon* accounted the wise men happy. [years.  
*Xenophilus* lived without sickness one hundred and seven  
 'Xamples of the best for ever mind, and intimate in kind.  
*Xerxes* wept at the changeable state of man.  
 'Xamine well how you improve, for that will be as you your  
 learning love.  
 'Xercise will much improve gain.  
 'Xperience is the mistress of all arts and sciences.  
 'Xcel in what you can, and strive to lead the van.  
 'Xpress your desire to learn by your diligence.

## Y

Youth is full of disorder, and age of infirmities,

Young

Young men lament your minutes mispent.  
Your time improve and squander it not away.  
Your spelling mind, and sense of what you write.  
Yield quietly to what must come unavoidably.  
Young men in strength should provide against age and weakness.

Youth in their prime, should manage well their time.  
Youth to the grave do go, as well as the aged do.  
Yield yourselves servants to righteousness and to holiness.  
Your copy mind, write fair, and of blotting beware.  
Your care should appear, by writing most fair.  
Your delight and your care will make you write fair.

Z

Zeal in a good cause will merit applause.  
Zeal mixt with love, is as harmless as a dove.  
Zealously strive for an eternal crown.  
Zealously strive with emulation to write.  
Zeal without knowledge is but religious wild fire.  
Zeal, if not rightly directed, is very pernicious.  
Zealously bend amain, fair writing to obtain.  
Zeno was the first of the stoic philosophers.  
Zaccheus he was low, but his faith was 'nt so.

*Short Lines for Text band.*

Abandon whatsoever is ill.—Be wise betimes.  
Care destroys the body.—Do the things that are just.  
Expect to receive as you give.—Frequent good company.  
Give what you give cheerfully.—Have good men in esteem.  
Imitate that which is good.—Keep God's commandments.  
Learn to be wise.—Make a right use of time.  
Nothing get, nothing have.—Observe modesty.  
Pleasures are very short.—Pains are very long.  
Quit all revenge.—Quiet your passions.  
Recompence a good turn.—Repent of your sins.  
Silence gives consent.—Sin very little.  
Time is more precious than gold.—Turn from your sins.  
Use moderate pleasures.—Use not bad company.  
Vain are some pleasures.—Vice is detestable.  
Wisdom is the principal thing.—Wise men are scarce.  
Yesterday cannot be recalled.—You cannot take too much care.

*Xenophon, Xenocrates, Xeno, and Xenobia.*

*Double lines in verse.*

All you that in fair writing would excel,  
 How much you write regard not, but how well.  
 Bear your pen lightly, keep a steady hand,  
 And that's the way fair writing to command.  
 Carefully mend in each succeeding line,  
 For that's the way to reach to what is fine.  
 Descending strokes are dark but upwards small  
 Even at the head and feet keep letters all.  
 From blots keep clean your books, and always mind  
 To have your letters all one way inclin'd.  
 Grace every letter perfect, full and small,  
 And keep a due proportion in them all.  
 Hold your pen lightly, grip it not too hard,  
 And with due care your copy well regard.  
 Join every letter to its next with care,  
 And let your strokes be admirably fair.  
 Keep a close hand and smoothly glide along,  
 Ascending fine and downright strokes are strong.  
 Let graceful beauty in each line appear,  
 And see the front doth not excel the rear.  
 Majestic grace both beautiful and strong,  
 Doth, or else ought, to every line belong.  
 No roughness at the edge should e'er be seen,  
 But all the letters should be smooth and clean.  
 On care depends the beauty of each line,  
 For that alone will make your art to shine.  
 Praise is deserved by the careful hand,  
 But for the unthinking doth correction stand.  
 Quit yourself nobly with a prudent care,  
 Of clumsy writing and of blots beware.  
 Remember strictly what the art enjoins,  
 Equal siz'd letters, and as equal lines.  
 Small letters must of equal height be seen,  
 The same of great, both beautiful and clean.  
 Time and delight will easy make the task!  
 Delight, delight's the only thing I ask!  
 Vain are the hopes of those who think to gain,  
 This noble treasure without taking pains.  
 While idle drones supinely dream of fame,  
 The industrious actually do get the same.  
 'Xemplar Lines are writing's surest law,  
 Precepts may lead us, but examples draw.  
 Youth is the progress for time in all arts,

Then



Then use your youth to gain the noblest parts.  
Zeal for attainment of each art will prove,  
One means of purchasing the gen'ral love.

Since good ink is necessary to good writing, I shall give a Receipt or two for making some of the best black ink in the world, which is as follows, viz.

*A receipt for making black Ink.*

**T**O six quarts of rain or river water, (but rain water is the best) put one pound and a half of fresh blue galls of Aleppo, (for those of Smyrna are not strong enough) bruised pretty small; eight ounces of copperas clean, rocky, and green; also eight ounces of clean, bright and clear gum Arabic; and two ounces of roch allum: Let these stand together in a large stone bottle, or clean stone pot, or earthen pot, with a narrow mouth, to keep it free from dust; shake roll, or stir it well, once every day; and you will have excellent ink in about a month's time; and the older it grows, the better it will be for use.

*Ingredients for a quart.*

1 quart of water, 4 ounces of galls, 2 ounces of copperas and 2 ounces of gum, mixed and stirred as above.

*Note,* If you soak the green peeling of walnuts, (at the time of the year when pretty ripe), and oak saw dust or small chips of oak in rain water, and stir it pretty often for a fortnight; the water strained off and used with the same ingredients as above, will render the ink still stronger and better.

*How to make red Ink.*

**T**AKE 3 pints of stale beer, (rather than vinegar,) and 4 ounces of ground Brazil wood: simmer them together for an hour; then strain it through a flannel, and bottle it up, well stopp'd for use.

Or, you may dissolve half an ounce of gum Senega, or Arabic, in half a pint of water; then put a pennyworth of vermillion into a small gallipot, and pour some of the gum water to it, and stir it well, and mix it together with a hair pencil, to a proper consistency; but it will not incorporate presently, but by the next day it will; then having a clean pen dip it into the ink, having first well stirred it with the pencil and then you may use it: It is a fine and curious red tho' not so free as the other. And after the same manner you may make any other coloured ink, as blue, green, yellow, purple,

purple, &c. having divers gallipots for that use. In like manner you may mix the shell gold, for curious occasions, pouring two or three drops according to direction into the shell, and mix it well with a clean hair pencil, and with it put a little into a clean pen, &c. The small shells may be bought at some fan sellers, or fan painters, at two or three for two-pence, or the large ones (which are best) at the colour shops, at sixpence a piece.

*To keep Ink from freezing or moulding.*

**I**N hard frosty weather Ink will be apt to freeze; which if once it doth, it will be good for nothing, for it takes away its blackness and beauty. To prevent which, (if you have not the conveniency of keeping it warm or from the cold), put a few drops of brandy or other spirits into it, and it will not freeze. And to hinder its moulding put a little therein.

*FAMILIAR LETTERS on several subjects, and on several Occasions.*

**B**EFORE we enter into *Arithmetic*, it may be proper to give some examples of Letters of various subjects, and upon divers occasions; which letters frequently read over, and sometimes copied, may be a good introduction to a handsome style, and a commendable manner of writing; besides the help and use they may be of in noting and observing the method of spelling good English, and orthographically placing great letters, or capitals, where they ought to be; and also in imprinting in the mind the due notion of points, stops &c. and when and where to be made.

Letters are variously worded, and ought properly to express the desires, thoughts, &c. of the writer to the reader, that thereby the receiver of the letter may fully understand, and be justly informed of the occasions, wants, or intentions of the sender.

Letters being wrote on several subjects, and on sundry occasions, they may be ranked under these denominations, or several heads following, viz. *Letters of proffered assistance, of thanks, of excuse, of reproof, advice, or of counsel, of recommendation, of remonstrance, of business, and of amusement; letters consolatory, congratulatory, and exhortatory; also familiar and mixed letters, containing various subjects.*

I shall not have room to touch upon every one of these particularly; but I shall give sundry examples promiscuously as follow, viz.

*A let-*

*A Letter from a Son to his Father.*

Honoured Father,

**A**S I have had no letter from you since your favour of the 8th of October last, which I answered by the next post, I take this opportunity of enquiring after your health, and that of my sister: I have herewith sent you, Sir, by Samuel Simple, the Pempsey carrier, a spaniel dog, called Tray who is an excellent good one of his kind, and fit for the sport of your place; he is very free for the water: and if he hath any fault, it is being a little too eager; but he is young, and may be brought to what you please to have him. Pray give my love to my sister, and be pleased to accept of my duty to yourself, who am,

London, Dec. 6.

1787.

Sir, Your most dutiful Son,  
and humble servant.

ANTHONY ADDLEHILL.

*The Answer.*

Dear Son,

*Pempsey, 28th Xber, 1787.*

I Received your letter of the 6th instant and thank you for enquiring after my health, which, I thank God, I perfectly enjoy at present, as I wish and hope you do yours.—I received your present of the dog; but the poor cur was almost starved, having (as I suppose) had nothing on the road, but he is now in condition, and hath been tried as to his mettle, which I find to be good. I have sent you by the carrier half a dozen wild ducks, which Tray fetched when I had shot them. Your sister remembers her love to you and hath sent you a turkey and a chine of bacon, to which I wish you and your friends (if you invite any) a good stomach. My prayers to God for your prosperity, temporal and eternal, are constantly offered up by

Your loving Father,

ANDREW ADDLEHILL.

P. S. We have a great many wild fowl in our level, so that you may expect another present of that kind in a little time.

Note. The letters P. S. signify Postscript; which name is given to any thing which is (like the three last lines in the preceding letter) wrote below the body of a letter.

*A Letter from a Young Man to his Uncle.*

Honoured Uncle,

**T**he many kind and courteous things that you have done for me, oblige me, in point of gratitude, as well as duty.

E

ty



ty, (as an opportunity now offers itself) to make a tender to you of my poor, but real and hearty service, in the affair between you and Mr. A. B. of this place, and if you'll please but to communicate to me your intentions, and give me your directions therein, I will execute them with all punctuality and will from time to time give you an exact account of my proceedings therein: Therefore, in expectations of your commands I remain

Norwich, Dec. 7  
1787.

Sir, your most obliged Nephew,  
and very humble servant  
BRIAN BING

*The Uncle's ANSWER.*

Nephew,

London, Dec. 12. 1787

I Take the offer of your service in the business between me and Mr A. B. of your city very kindly, and think none fitter to adjust that affair than yourself; but I am unwilling to go to law; and had rather, much rather, that you would endeavour to bring him to some reasonable accommodation for in such contests the winner is commonly a loser in the end: Therefore, if you can bring him to any reasonable terms, I shall be very glad. You understand the affair, and I shall commit it wholly to your discreet and good management, being persuaded, you'll do for me as for yourself; in which opinion I remain,

Your loving and affectionate Uncle  
BASIL BING

*From a Niece to her Aunt.*

Madam,

THE trouble I have already given you puts me to the blush, when I think of intruding again on your goodness; but necessity which frequently obliges us to such actions as are contrary to our inclination, is the motive that induces me to bethus trouble some now. Pray dear Madam excuse me if I once more beg your assistance; which I do not doubt but you very well know I stand in need of at this time and I shall ever have a grateful remembrance of your goodness to me; and I hope I shall be one time or other in capacity of making some return for the many obligations your goodness hath conferred upon me.

Your most respectful Niece  
and very humble servant  
PENELOPE PIST

London, May 9.  
1787.

*A Letter of proffered assistance to a Friend.*

Dear friend.

I Should be false to true friendship, if I would neglect or cast off a friend in adversity. I have heard that your



under some misfortune, and at present need my assistance; I therefore send you these lines for your consolation, desiring you to bear up against your ill luck, with as much presence of mind as you can: for, assure yourself, I shall suddenly follow this epistle in person, and come, I hope, opportunely enough for your assistance: till which time take courage, and be assured you shall not be disappointed of timely assistance, from, dear friend,

Your's in reality,

TIMOTHY TIMELY

*A Brother to a Sister.*

Dear Sister,

**M**Y great distance and long absence from you (though I have not wanted good company) makes me very solicitous concerning your welfare; natural affection inclines me strongly to have you in remembrance, tendering your health and welfare in every respect as dear as my own; and there is nothing at my command, but, if you request, it shall be freely yours. Notwithstanding the distance, I propose (God willing) to make you a visit very shortly, and had done it before now, but an urgent occasion interposed; the particulars of which being too long for a letter, I shall acquaint you with when I see you. Pray give my due respects to all friends, particularly to honest Mr S. T. and so, in expectation of finding you all well at my arrival, I conclude,

Dear Sister,

London, Dec. 6.

1787.

Your affectionate Brother,  
and humble Servant,

HENRY HEARTY.

*A Letter from a Youth at School to his Parents.*

Honoured Father and Mother,

**I** Received your kind letter, of the 4th of November last, and also the several things therein mentioned, by the Chichester carrier, for which I return you my most humble and hearty thanks; they coming very seasonably to the relief of my necessities.—I endeavour to make the best improvement in my learning that I possibly can, (though at first it seemed a little irksome and hard) and I hope to gain the point a last for which you sent me hither. Pray, dear Parents, accept of my most humble duty to yourselves, and kind love to my brothers and sisters, and to my quondam Playfellows particularly to Jackey Singlebrains; and tell him I hope by this time he begins to be a little serious.—I am,

E 2

London

London Dec. 6.

1787

Honoured Parents,

Your dutiful Son, and humble Servant

STEPHEN STUDIOUS.

ANOTHER.

Honoured Sir,

I Am very much obliged to you for all your favours : all I have to hope is, that the progress I make in learning will be no disagreeable return for the same : gratitude duty, and a view of future advantages, all conspire to make me sensible how much I ought to labour for my own improvement, and your satisfaction, in order to shew myself, upon all occasions, to be

Eaton School,

May 8. 1787.

Your most obedient Son,

DANIEL DILIGENT.

*A letter of Recommendation.*

SIR

THE bearer hereof, Francis Faithful, I send to you as one whose honesty you may rely on : and my experience of his conduct and fidelity gives me a certain kind of confidence in recommending him to you ; for you know me, Sir, and I believe you cannot in the least think, that I would recommend any one to you, of whose probity I had the least shadow of doubt or suspicion. I am, with due respect,

Sir,

Your real Friend and humble Servant,

GEORGE GENEROUS.

*A Letter of Thanks.*

SIR,

I Received your favour, with the kind present which accompanied it : I have no other way of expressing my gratitude at present but my hearty thanks, every thing you do has a peculiar excellence, as the manner of doing it is as agreeable as the action itself : But I must stop, lest I should offend that delicacy, which I would commend, and which is constantly admired by,

Sir,

Your most obliged and humble Servant,

GEORGE GRATEFUL.

*To a Country Chapman.*

Mr Francis Fairdealer,

London 8th Dec. 1787.

SIR,

YOU and I have formerly had trading together, and it is not my fault that we do not continue so to do ; for assure yourself, I have a great value and respect for you, and on that account, none shall be more ready to oblige you in

what

what I may; therefore let us once more re-assume our dealings together; and you shall find, that for any goods you have occasion for in my way, none *shall* use you more kindly than.

SIR,

Your real friend and humble servant,

TITUS TRADWELL

*A Letter of Congratulation.*

SIR,

As I am perfectly sincere in the professions of friendship which I have constantly made to you, you will certainly believe that I am sensibly rejoiced at your late good fortune; as your merit gave me occasion to foresee it, long before it happened, so I was not at all surpris'd on hearing thereof; I heartily wish you greater success; and beg, that you will always continue me in the number of those whom you permit to subscribe themselves, as I now do,

London, April 2.

1787.

Sir, Your most obedient  
and most faithful servant,

RALPH REAL.

*A Letter of Enquiry after Health.*

Hammersmith, 9th of Octob. 1787.

SIR,

NOT having from you in such a length of time as from the 1st of June last, I am concerned, lest sickness, or some other accident, hath happened to you, or some one of the family; my uneasiness occasions my giving you this trouble, and I wish that I may find things with you better than my fears suggest; however be pleas'd to let me know the certainty with all convenient speed; and thereby you'll very much oblige, Sir,

Your real friend and very humble Servant,

PETER PITIBUL.

*A Letter by way of Petition to a Friend.*

SIR,

I Am uncertain whether my late misfortunes have come to your knowledge; however I most humbly presume on your good nature, being assured by sundry examples of your compassion, that you will think of and take pity on the distressed: therefore, as an object truly deserving compassion, I most humbly implore, and petition you to consider the many losses and disappointments that I have lately met with, which have reduced me to such necessitous circumstances, that I cannot possibly proceed in any affairs; You was pleas'd once



to stile me your friend, and so I was indeed: and so I would most certainly be now, and shew it by a signal proof of kindness, if our circumstances were changed, by standing between you and misfortune, and screening you from the contempt incident to poverty and distress. I doubt not, Sir, but your generosity and goodness is as great; and I hope, with all humility, you will be pleased to interpose your good offices between ruin and Sir,

Your very humble Servant,

LAWRENCE LUCKLESS.

*A letter of Friendship.*

Dear Friend,

**I**T is now a long time (as I account it) since you and I have had any mutual converse by letter, which to me is a great unhappiness; and really, if distance did not somewhat excuse, I should be apt to tax you with unkindness; but however, perhaps you may not have the same convenience of writing at your place (for want of postage) as we have at ours, and on that account I shall not insist on it as an infringement of friendship; the chief purpose of this being to enquire af your welfare, and to have an answer given to,

Sir,

Your real Friend, and very humble Servant.

KENDRICK KINDLY.

*A Letter of Business.*

SIR,

**Y**OURS of the 25<sup>th</sup> ult. is now before me; in answer to which, I positively declare, That Mr A. B. hath not been with me, to present the bill of exchange that you mention in your letter of advice to me; and therefore there can be no just cause or protest, or any other charge put on London, May 1.

Sir, your humble servant;

1787.

JOHN INNOCENT.

It is as proper to know how to subscribe, and how to direct as it is to write a letter.

**SUBSCRIPTIONS.**

*To the King's most Excellent Majesty.*

*To the Queen's most Excellent Majesty.*

*To the Prince, To his Royal Highness, &c.*

*To the Princess, To her Royal Highness, &c.*

*To Archbishops.*

*To his Grace the Lord Archbishop of Canterbury; or,*



*To the most Reverend Father in God.*

*To Bishops.*

*To the Right Reverend Father in God.*

*To Deans, Archdeacons, &c.*

*To the Reverend A B D D. Dean of W.*

*To the inferior Clergy.*

*To the Reverend Mr A. &c or to the Reverend Doctor, &c.*

*To the great Officers of State.*

*To the Right Honourable P. Earl of H. Lord High Chancellor of Great Britain—Lord President of the Council—Lord Privy Seal—One of his Majesty's principal Secretaries of State, &c.*

*To temporal Lords.*

*To his grace the Duke of, &c. The most Honourable the Marquis of, &c. To the Right Honourable the Earl of, &c. To the Right Honourable the Lord Viscount, &c. To the Right Honourable the Lord, &c.*

The eldest Sons of Dukes, Marquises, and Earls, enjoy by the courtesy of England, the second title belonging to their father: thus the eldest son of the Duke of Bedford is called Marquis of Tavistock; of the Duke of Grafton, Earl of Euston: of the earl of Macclesfield, Lord Viscount Parker, &c. and their daughters are called Ladies, with the addition of their christian and surnames; thus, Lady Carolina Russel, Lady Augusta Fitzroy, Lady Betty Parker, &c.

The younger sons of Dukes are in like manner called Lords: and those of Marquises and Earls, together with all the children of Viscounts and Barons, are stiled Honourable.

To a Baronet Honourable; to a Knight, Right Worshipful, and to an Esquire, Worshipful—Every Privy Councillor, though not a Nobleman, hath the title of Right Honourable. All Ambassadors have the stile of Excellency; as hath also the Lord Lieutenant of Ireland, and the Captain General of his Majesty's forces. The Lord Mayor of London, during his Mayoralty, hath the title of Right Honourable. And the Sheriffs, during their office, have the title of Right Worshipful. All Mayors of Corporations have the title of Esquires, during their office.

*To the King; Sir, or May it please your Majesty.*

*To the Queen; Madam or May it please your Majesty.*

*To the Prince; Sir, or, May it please your Royal Highness.*

*To the Princess; Madam, or May it please your Royal Highness.*

*To a Duke; My Lord Duke or May it please your Grace.*

*To a Duches; Madam or may it please your Grace.*

*To a Bishop; May it please your Grace.*

To a Marquis; *My Lord, or, May it please your Lordship.*  
 To a Marchioness; *Madam or, May it please your Ladyship.*  
 To an Earl, Viscount or Baron; *My Lord, or, May it please your Lordship.*

To their Consorts; *Madam, or, May it please your Ladyship.*

To a Bishop; *My Lord, or, May it please your Lordship.*

To a Knight; *Sir, or, May it please your Ladyship.*

To his Lady; *Madam, or May it please your Ladyship.*

To a Mayor, Justice of the Peace, Esquire, &c. *Sir, or, May it please your Worship.*

To the Clergy; *Reverend Sir, Mr Dean; Mr Archdeacon; &c.* as circumstances may require.

At subscribing your name, conclude with the same title you began with; as, *My Lord, Your Lordship's &c.*

To either House of Parliament, and to Commissioners, or bodie corporate.

*To the Right Honourable the Lords Spiritual and Temporal in Parliament assembled.*

*To the Honourable the Knights, Citizens, and Burgesses in Parliament assembled.*

*To the right Honourable the Lords Commissioners of the Treasury or Admiralty.*

*To the Honourable the Commissioners of his Majesty's Customs—Revenue of the Excise, &c.*

*To the Right Worshipful the Governors of Christ's Hospital, London.*

*To the Masters, Wardens, and Court Assistants of the Worshipful Company of Drapers.*

#### *Of Secret Writing.*

**H**ERE it may not be improper to say something of Secret Writing; to which bishop *Wilkins*, in his book of *Mathematical Magic*, speaks largely; but it is principally concerning writing in cypher, which requires great pains and an uncommon share of ingenuity, both in writers and readers. But however, I shall shew two or three particular ways, that are very pretty and amusing, and also very easy, both as to cost and pains.

*First*, If you dip your pen in the juice of a lemon, or of an onion, or in your own urine, or in spirits of vitriol and write on clean paper whatever you intend, it shall not be discerned till you hold it to the fire, and then it will appear legible. And if with any of the aforementioned you write on your skin, as on your arm, and back of your hand, &c. it shall not be seen till you burn a piece of paper, and with the  
 ashes,

ashes rub on the place, and then it will appear very plain ; and thus I have experienced and tried, and therefore can say *probatum est*.

Another way is, when you write a letter that you intend shall not be discovered, but to those you think fit, first to write your thoughts on one side of your letter with black ink, as usual, (but it ought to be on thin paper) and then, on the contrary side, go over the said matter that you would have secret with a clean pen dipped in milk, and that writing shall not be read without holding to the fire, as mentioned above, and then it will appear legible in a blueish colour.

A third method is, to have two pieces of paper of an equal size, and the uppermost cut in chequered holes or square, big enough to contain any word of six or seven syllables, and in those squares write your mind in regular sense ; and then take off the said chequered paper, and fill up the vacancies with words of any kind which will render it perfect nonsense, and not capable of being read to any purpose of intelligence. Then transmit and send the said uppermost, or chequered paper, or another exactly of the same form, to your correspondent ; whereby he shall, by laying it nicely on your said letter, read your intended sense, without being perplexed with the words of amusement intermixed, which make it altogether unintelligible.

Or again, You may write to your friend in proper sense with common ink, and let the lines be at so commodious a distance, that what you intend to be secret may be written between them with water, wherein galls have been steeped a little time but not long enough to tincture the water ; and when dry, nothing of the writing between the said lines can be seen ; but when it is to be read you must with a fine hair pencil dipp'd in copperas water, go between the said lines, and so make it legible.

*Note*, This way will give no ground for suspicion, because the letter seemeth to carry proper sense in those lines that are set at such a proper distance, &c.

### OF ARITHMETIC.

**A**FTER writing, the next necessary step towards qualifying a person of business is the understanding that truly laudable and most excellent accomplishment, the noble science of Arithmetic, a knowledge so necessary in all the parts of life and Business, that scarce any thing is done without it.

In my directions for its attainment, I shall proceed with such plainness of method, and familiarity of stile, as shall render



der it easy to be understood, and conspicuous to the meanest capacity.

And first of *Notation and Numeration*.

In *Notation*, We must note or observe, that all numbers expressed by, or composed of these ten figures or characters following viz.

*One, Two, Three, Four, Five, Six, Seven, Eight, Nine, Cypher.*

1 2 3 4 5 6 7 8 9 0

Nine of these are called significant figures, to distinguish them from the *Cypher*, which of it self signifies nothing; but as it is placed (in whole numbers) serves to increase the value of the next figure or figures that stand before it: as 3 is but three; but before the cypher thus 30 the 3 becomes thirty, &c. But in *Decimal Fractions* (0) decreases the value of the figure behind it, for therein 3 is three tenths of any thing, but by placing 0 before it thus 03 it is decreased from 3 tenth parts to three hundredth parts of any thing, &c.

—We are to note, That every one, or any of the above mentioned nine figures, or digits, have two values; one certain, and another uncertain; the certain value is when it stands alone by itself; the uncertain is, when joined or placed with other figures or cyphers: for when any one of these figures stand alone, they signify no more than their own simple value: as 5 is but five, 4 but four: 6 but six, and 3 no more than three, &c. and this is the certain value of a figure. But when any other figure or cypher is annexed, they then are increased in their value ten times; as 5 or 5 units, or ones, to 5 tens or fifty; 4 to 4 tens or forty; 6 to 6 tens or sixty; 3 to 3 tens or thirty: as thus, 51, fifty-one, 42, forty-two; 63, sixty-three; 34, thirty-four, &c. Again, if any of the said figures stand in the third place towards the left hand, they signify so many hundreds as they expressed units or ones: as 500, is five hundreds, 400, four hundreds, 600, six hundreds, and 300, three hundreds, &c. If any of them possess the fourth place towards the left hand, they are so many thousands as they contain units; And so any, or every figure, increases by a tenfold proportion, from the right hand to the left, according to the place it is found or stands in; so that 5 may either be five, or fifty; five hundred, or five thousand; in the first place 5, in the second 50, in the third 500, in the fourth place, 5000, &c. The true value of figures in conjunction, may be fully learnt and understood by the following table.

The



|    |           |                |
|----|-----------|----------------|
| 12 | C         | Thous. of M.   |
| 11 | X         | Thous. of Mil. |
| 10 |           | Thous. of Mil. |
| 9  | C         | of Millions.   |
| 8  | Ten       | of Millions,   |
| 7  |           | Millions.      |
| 6  | C         | of Thousands.  |
| 5  | Ten       | of Thous.      |
| 4  |           | Thousands.     |
| 3  | Hundreds, |                |
| 2  | Tens.     |                |
| 1  | Units.    |                |

Thous. of Millions.  
Thousands.  
Units or Ones.

[illegible]

123 456 789 012  
12 345 678 901  
1 234 567 890  
123 456 789  
12 345 678  
1 234 567  
123 456  
12 345  
1 234  
123  
12  
1

For the easier reading of any number, first get the words at the head of the table by heart: as units, tens, hundreds, thousands, &c. and apply them thus, 75, five units, five; and 7 tens, seventy; that is seventy-five. Again, 678; 8 units eight; 7 tens, seventy; and 6 hundreds, six hundreds; that is, six hundred seventy eight. Once more, 3456: 6 units, six; 5 tens, fifty; 4 hundreds, four hundred; 3 thousands, three thousand; together, three thousand four hundred fifty-six. The 4th line of the table, viz, 123456789, may be read thus, one hundred twenty-three millions, four hundred fifty six thousand, seven hundred eighty nine. But the manner of reading any number may be rendered more intelligible by stops, thus; make a comma after every third figure or cypher, beginning at the right hand and so on towards the left thereby distinguishing every third place into hundreds, as hundreds of units, hundred of thousands, hundreds of millions, and hundreds thousands of millions. &c. And for trial; let's read the first line of the table; where the last place in valuation, is hundred thousands of millions, and being pointed into periods stand thus, 123, 456, 789, 012: and is to be read thus. One hundred twenty three thousand, four hundred fifty-six millions seven hundred eighty nine thousand

no hundreds and twelve. Again, the following number, *viz.* 276, 245, 678 921, 460, is to be read thus; 276 millions of millions, 245 thousands of millions, 678 millions, 921 thousand, 460 units or ones: that is two hundred seventy six millions of millions, two hundred forty five thousand six hundred seventy eight millions, nine hundred twenty-one thousand, four hundred and sixty. The foregoing *Table of Numeration* is on the right hand distinguished into such periods, for the easier reading thereof; and the like is frequently done in the public offices, and by men of business,

Numbers to be read or written, *viz.*

96, Ninety six,  
242, Two hundred forty two,  
7924, Seven thousand 9 hundred and 24,  
54006, Fifty four thousand and six,  
524707, Five hundred 24 thousand 707,  
4706240, Four million, 706 thousand 240,  
60700472, Sixty millions, 700 thousand 472,  
474965204, Four hundred 74 millions, 960 thousand 204,  
4214007042, Four thousand 214 millions 7 thousand 42,  
44214800240, Forty four thousand 214 millions 8 hundred thousand 240.

*Of Numerical Letters.*

Numbers were anciently expressed by letters; and it is necessary to understand them, for the reader reading the dates of years, frequently used in the title pages of books, on funeral monuments, in Roman history, &c.

I signifies One,

V Five,

X Ten,

L Fifty,

C an Hundred,

CC two Hundred,

D or IJ five hundred,

M. or CIJ a Thousand,

IJJ five Thousand,

CCIJ ten Thousand,

IJJJ fifty Thousand,

CCCCIJJJJ a Hundred Thousand.

IJJJJJJ Five Hundred Thousand.

CCCCCIJJJJJJ Ten Hundred Thousand, or a million.

M DCC, LXXXVIII, expresses this present date of 1788.

M. being One thousand, D five Hundred, CC two Hundred, and LXXXVIII. Eighty-eight: together, One thousand seven Hundred and Eighty eight.

When a letter of inferior value stands after one of superior, its value is to be added thereto, thus VI, VII, and VIII, signify Six, Seven, and Eight: but when a letter of inferior value is placed before one of superior, then its value is to be taken

taken therefrom, thus IV. IX, XL, and XC, signifies four Nine, Forty and Ninety.

**A D D I T I O N.**

**I**S the putting together two or more numbers or sums, so as their total value may be discovered or known,

Herein we must always observe to set the numbers to be added orderly one under the other; that is, units under units, tens under tens, hundreds under hundreds, &c. as in the subsequent examples.

*Addition of Numbers of one Denomination.*

| <i>Yards.</i> | <i>Gallons.</i> | <i>Pounds.</i>      |
|---------------|-----------------|---------------------|
| T. U.         | H. T. U.        | x of<br>th H. T. U. |
| 2 4           | 7 5 6           | 5 7 9 6 2           |
| 4 2           | 4 3 2           | 3 9 7 4 4           |
| 6 8           | 5 7 8           | 6 7 2 2 2           |
| 8 6           | 6 9 6           | 7 9 6 7 4           |
| 2 4           | 4 2 2           | 2 4 9 3             |
| 4 2           | 6 7 8           | 3 9 0               |
| <hr/> 2 8 6   | <hr/> 3 5 6 2   | <hr/> 2 4 7 4 8 4   |

In addition of Simple numbers, whether it be *Yards, Gallons, Pounds*, or any thing else, remember to carry 1 for every 10 that you find in the right hand row or rank of figures, being units, to the next row of tens; and the like for the rank of tens to the row of hundreds, &c. and whatever it makes in the last row, you must set down, amount to what it will.

The numbers above are set down in order, as before directed; that is, units under units, tens under tens, &c. as may be plainly understood, by being indicated at the head of each row or rank, by U, T, H, &c. signifying Units, Tens, Hundreds, &c. Then in casting up each example, to know its total, I begin at the right hand, or unit's rank, of the first example, and say 2 and 4 is 6, and 6 is 12, and 8 is 20, and 2 is 22, and 4 is 26; in which row there are two tens and 6 over; wherefore I set down 6 just under its own rank, and carry 2 to the next row, and say 2 that I carry and 4 makes 6, and 2 is 8, and 8 is 16, and 6 is 22, and 4 is 26, and 2 is 28; and this being the last row I set down the amount viz. 28 so that the total number of yards is found to be 286. And

the amount of the next or 2d example, is found by the same method to be 3562 gallons. And in the third and last example, the total number of pounds is found by the same way to be 247484. And so the total of any other example of the same kind, viz. simple numbers of one denomination may be found. *Note*, That when any of the ranks amount to just 10, 20, 30, 40, 50, &c. then you must set down the 0 under its proper rank, and carry either 1 2 3 4 or 5, according to the number of tens that you find, to the next row.

And so much for *Addition of numbers of one denomination*, which never varies from what has been said above; observing strictly to keep to the critical, and nicely setting down in perpendicular order your several numbers, that units may precisely and directly stand under units, tens under tens, &c. as hath been fully declared before. The next in order of course, is *Addition of numbers of several denominations*, *Addition of money*.

In *England or Great Britain*, accounts are kept in pounds, shillings, pence, and parts of a penny; so you are to note that,

4 Farthings make 1 penny,  
12 Pence 1 Shilling, and  
20 shillings 1 Pound.

In adding of these you are with the same punctuality to mind, that pounds be set directly under pounds, shillings under shillings, pence under pence, and farthings under farthings; as in the examples hereafter following.

But before you proceed it will be necessary to have the following tables by heart, for the ready remembrance of how many shillings there are in a number of pence, and how many pounds are contained in a number of shillings, &c.

*Note*, That *l* stands for pounds, *s* for shillings, *d* for pence, and *q* for farthings those being the initial letters of *libra*, *solidus*, *denarius*, and *quadrans*, Latin words of the same signification.

| Pence. | s | d  | s.    | l. | s. |
|--------|---|----|-------|----|----|
| 20 is  | 1 | 8  | 30 is | 1  | 10 |
| 30     | 2 | 6  | 40    | 2  | 0  |
| 40     | 3 | 4  | 50    | 2  | 10 |
| 50     | 4 | 2  | 60    | 3  | 0  |
| 60     | 5 | 0  | 70    | 3  | 10 |
| 70     | 5 | 10 | 80    | 4  | 0  |
| 80     | 6 | 8  | 90    | 4  | 10 |
| 90     | 7 | 6  | 100   | 5  | 0  |



|     |    |   |     |   |    |
|-----|----|---|-----|---|----|
| 100 | 8  | 4 | 110 | 5 | 10 |
| 110 | 9  | 2 | 120 | 6 | 0  |
| 120 | 10 | 0 |     |   |    |

The use of these tables is this: Whenever you are casting up any sum of money, you begin at the right hand, (as before in sums of one denomination) suppose at the place of pence, then if the rank, row, or denomination of pence, amounts from the bottom to the top, to 56, your table of pence tells you that 50d is 4s. and 2d. to which adding 6d. the sum is 4s. 8d; if to 92d. the table tells you, that 90d. is 7s. and 6d. which with 2d. over is 7s. 8d; and if to 81d. the table shews, that 80d. is 6s. 8d. and 1d. more makes 6s. 9d.

The *Shillings Table* serves to lead you to a quick recollection how many pounds there are in so many shillings; as, admit the rank of shillings arise to 57s. the table says, that 50s is 2l. 10s. and 7s. over make 2l. 17s. if to 84s. the table declares that 80s. is just 4l. and 4s. over make 4l. 4s. if to 112s. the table tells you, that 100s. is 5l. and 12s. more make 5l. 12s.

### ADDITION OF MONEY.

Money owing and money received as follows.

| (1)      |             | l. | s. | d. | (2)           |            | l.  | s. | d. |
|----------|-------------|----|----|----|---------------|------------|-----|----|----|
| Owing to | Mr Andrews  | 4  | 12 | 6  | Received from | Tobacco    | 46  | 10 | 0  |
|          | Mr Bent     | 7  | 06 | 9  |               | Sugar      | 79  | 16 | 0  |
|          | Mr Crawly   | 4  | 12 | 0  |               | Indigo     | 42  | 18 | 3  |
|          | Mr Dupper   | 6  | 17 | 7  |               | Broadcloth | 56  | 12 | 4  |
|          | Mr Edlin    | 5  | 06 | 6  |               | Canary     | 60  | 16 | 0  |
|          | Mr Franklin | 4  | 12 | 3  |               | Port wine  | 64  | 07 | 0  |
|          | Mr Gregory  | 6  | 00 | 0  |               | Rice       | 23  | 12 | 0  |
|          | Mr Fisher   | 5  | 15 | 4  |               | Logwood    | 60  | 0  | 10 |
|          |             | 45 | 04 | 11 |               |            | 496 | 02 | 10 |

I begin with the right-hand rank, that is the pence in the example of money owing, and say, 4 and 3 is seven, and 6 is 13, and 7 is 20, and 9 is 29, and 6 makes 35 pence; now 30 pence, according to the table, is 2s. 6d. and 5d. more makes 2s. 11d. I set down 11 exactly under the rank of pence, and say, 2 shillings that I carry (which I do to the rank of shillings), and 5 is 7 and 2 is 9, (for I take first only the units rank of shillings), and 6 is 15, and 7 makes 22, and 3 is 4 and 6 is 30, and 2 makes 32: and now being come at the top of the sum, and it making 32, I come down with the tens of



Addition of Avoirdupoise Weight.

By this weights are weighed all kinds of Grocery goods or wares, or goods subject to waste; as Tobacco, Sugars, Fruit and Drugs; as also Flesh, Butter, Cheese, Allum, Tallow, Iron, Brass, Copper, Lead, Tin, or Pewter, Pitch, Tar, Rosin, Hemp, Flax, Soap, Salt, &c.

A Table of this Weight is as follows, viz.

|                   |                           |        |      |
|-------------------|---------------------------|--------|------|
| 4 Quarters make   | 1 dram                    | marked | dr.  |
| 16 Drains         | 1 ounce                   |        | oz.  |
| 16 Ounces         | 1 pound                   |        | lb.  |
| 28 Pounds         | 1 qr. of a hundred weight |        | qrs. |
| 4 Quarters        | 1 hundred weight          |        | C.   |
| 24 Hundred weight | 1 ton                     |        | T.   |

| 10    | 4    | 28  | 10    | 4    | 28  | 10    | 4    | 28  | 10    | 16  | 16  |
|-------|------|-----|-------|------|-----|-------|------|-----|-------|-----|-----|
| C.    | qrs. | lb. | C.    | qrs. | lb. | C.    | qrs. | lb. | lb.   | oz. | dr. |
| 5     | 1    | 16  | 24    | 1    | 12  | 9     | 1    | 16  | 24    | 11  | 12  |
| 4     | 2    | 24  | 42    | 2    | 00  | 4     | 3    | 26  | 42    | 14  | 15  |
| 6     | 3    | 06  | 16    | 1    | 12  | 7     | 1    | 00  | 64    | 10  | 11  |
| 7     | 1    | 12  | 35    | 3    | 24  | 5     | 3    | 27  | 29    | 09  | 10  |
| 9     | 0    | 20  | 19    | 0    | 20  | 4     | 3    | 00  | 16    | 12  | 13  |
| 6     | 2    | 00  | 26    | 1    | 22  | 2     | 2    | 02  | 27    | 13  | 14  |
| <hr/> |      |     | <hr/> |      |     | <hr/> |      |     | <hr/> |     |     |
| 39    | 3    | 22  | 151   | 3    | 06  | 34    | 3    | 15  | 206   | 09  | 11  |
| <hr/> |      |     | <hr/> |      |     | <hr/> |      |     | <hr/> |     |     |

In these examples the manner of proceeding is the same as in the former, observing, that the number of units of each lesser denomination, which makes an unit of the next greater, found by the preceeding table, is placed above each rank of numbers; that is to say, in the first example, 28, the number of pounds contained in a quarter of an hundred weight, is placed over the column of pounds; now that column when added up, makes 78, which contains two 28's and 22 over, wherefore I set down 22 under the column of pounds, and carry two to the column of quarters; and so on.

*Note.* That in weighing at the water-side, or elsewhere they do not weigh by the ton, though some goods are sold by it, as Iron, Logwood, Cheese, &c. but by the hundreds quarters, and pounds, which are afterwards reduced to, and computed by tons.

*Addition Of Troy weight.*

By this weight are weighed jewels, gold, silver, pearls, and medicines, and the usual denominations are pounds, ounces, penny weights and grains, as in the following table. viz.

24 Grains make 1 pennyweight,  
20 Pennyweights 1 ounce, and  
12 Ounces 1 pound Troy.

*Examples Of Troy weight.*

| 6 Ingots of silv. wt. viz. |     |     |     |     | 220 12 20 24 |     |     |     |  | 12 10 24  |     |     |  |  |
|----------------------------|-----|-----|-----|-----|--------------|-----|-----|-----|--|-----------|-----|-----|--|--|
| No                         | lb. | oz. | pw. | gr. | lb.          | oz. | pw. | gr. |  | oz.       | pw. | gr. |  |  |
| 1 wt.                      | 4   | 05  | 12  | 10  | 14           | 06  | 10  | 11  |  | 204       | 10  | 14  |  |  |
| 2                          | 5   | 04  | 16  | 17  | 24           | 10  | 11  | 12  |  | 96        | 07  | 17  |  |  |
| 3                          | 3   | 11  | 19  | 20  | 21           | 06  | 07  | 17  |  | 100       | 21  | 12  |  |  |
| 4                          | 4   | 06  | 07  | 12  | 22           | 10  | 12  | 14  |  | 56        | 16  | 20  |  |  |
| 5                          | 5   | 01  | 11  | 12  | 16           | 11  | 12  | 13  |  | 212       | 10  | 23  |  |  |
| 6                          | 4   | 11  | 12  | 13  | 21           | 07  | 06  | 17  |  | 96        | 19  | 12  |  |  |
| 28 06 05 12                |     |     |     |     | 122 05 01 12 |     |     |     |  | 767 17 02 |     |     |  |  |

If what was before said be duly observed, the performance of the above examples will be attended with no difficulty.

*How to prove Addition.*

**I**N all additions, whether of simple numbers, that is numbers of one denomination or in examples, compound, that is of divers denominations, as pounds, shillings, pence, and farthings &c. the readiest method of proof is to cast the same downwards, (beginning at the top as you did the same upwards beginning at the bottom,) and if that operation produces the same total, the work is infallibly right, and beyond any contradiction; and this is better, and more feasible than the method used in schools, of making two totals, by omitting the upper line in the second. I might here also give the several examples of other additions, such as, Apothecaries weight, cloth, liquid, dry, and long measure, time, &c. but the method serves for any of them, having respect to the tables belonging to those several denominations, which are as follows.

*A Table of the parts of Apothecaries Weight.*

|                     |                  |
|---------------------|------------------|
| 20 Grains 1 Scruple | scr. ʒ 1 Scruple |
| 3 Scruples 1 Drachm | dr. ʒ 1 Drachm   |
| 8 Drachms 1 Ounce   | oz. ʒ 1 Ounce    |
| 12 Ounces 1 Pound   | lb. ʒ 1 pound    |



By these weigh's they compound their medicines, but they buy and sell their drugs by Avoirdupoise Weight.

*Cloth Measure.*

|                      |                 |
|----------------------|-----------------|
| 4 Nails, or 9 inches | 1 qr. of a Yard |
| 4 qrs. or 36 inches  | 1 Yard          |
| 5 qrs. or 45 inches  | 1 Ell English   |
| 3 qrs. or 27 inches  | 1 Ell Flemish   |
| 6 qrs. or 45 inches  | 1 Ell French    |

*A Table of Wool Weight.*

Note, That 7 lb. make 1 Clove; 2 Cloves, or 14 lb. a stone; Stone or 28 lb. 1 Todd; 6 Todds and  $\frac{1}{2}$ , 1 Wey, or 182 lb; 2 Weys, or 364 lb. 1 Sack; and 12 Sacks 1 Last, or 4368 lb.; 240 lb. 1 Pack of Wool.

Note, That 1 lb. 2 oz. 12 pw. Troy is equal to a pound Avoirdupoise; and a pound Troy is about 13 oz  $2\frac{1}{2}$  dr. Avoirdupoise.

|                       |                      |             |
|-----------------------|----------------------|-------------|
| A pound weight Troy   | } of silver is worth | } 3 02 2    |
| A pound wt. Avoirdup. |                      |             |
| 100l. } in gold       | } weighs             | } 1 11¼     |
| } in silver           |                      |             |
|                       |                      | A voir. wt. |

A pound Avoirdupoise is heavier than a pound Troy; but an ounce Troy is heavier than an ounce Avoirdupoise.

*A Table of Liquid Measure.*

Liquid measure of two sorts, viz. one for wine, brandy &c. and the other for ale and beer.

*Wine, &c.*

|                       |                            |
|-----------------------|----------------------------|
| 8 Pints 1 Gallon      | 2 Hogsheads 1 Pipe or Butt |
| 42 Gallons 1 Tierce   | 2 Pipes or Butts 1 tun, or |
| 63 Gallons 1 Hogshead | 252 Gallons                |
| 84 Gallons 1 Puncheon |                            |

Note, that sweet oil hath 236 gallons to the tun; but oil from Greenland hath 252 gallons to the tun.

Note, the wine gallon contains 23 cubic or solid inches, by which all liquids are measured, except beer and ale.

*Beer Measure.*

|                       |                                     |
|-----------------------|-------------------------------------|
| 8 Pints 1 Gallon      | 2 Kilderkins 1 Barrel, or 36 Galls. |
| 9 Gallons 1 Firkin    | 1 Barrel, and a half, or 54 Gallons |
| 4 Firkins 1 Kilderkin | one Hogshead.                       |

*Ale Measure.*

|                  |                           |
|------------------|---------------------------|
| 8 Pints 1 Gallon | 2 Kilderkins 1 Barrel, or |
|                  | Gallons                   |

8 Gallons 1 Firkin of Ale

Soap or Herrings

2 Firkins 1 Kill-irkin

Note the Beer and Ale gallons are the same, viz 282 solid inches; but with this difference, i. e. the Barrel of Beer contains 1228 cubic inches, or 4 gallons more, than the barrel of Ale.

*In a Tun of Wine are*

2 Pipes or Butts

6 Tierces

252 Gallons

504 Pottles

1008 Quarts

2016 Pints

*In a Puncheon are*

84 Gallons

168 Pottles

336 Quarts

672 Pints

*In a Barrel of Beer are*

2 Kilderkins

4 Firkins

36 Gallons

72 Pottles

144 Quarts

288 Pints

32 Gallons

1 Barrel and a half, or 48 Gallons 1 Hogshead.

*In a Pipe or Butt are*

2 Hogsheads

3 Tierces

126 Gallons

252 Pottles

504 Quarts

1008 Pints

*In a Hogshead are*

63 Gallons

126 Pottles

252 Quarts

504 Pints

*In a Barrel of Ale are*

2 Kilderkins

4 Firkins

32 Gallons

64 Pottles

128 Quarts

256 Pints

*Dry Measure.*

2 Pints 1 Quart

2 Quarts 1 Pottle

2 Pottles 1 Gallon

2 Gallons 1 Peck

4 Pecks 1 Bushel land-measure

5 Pecks 1 Bushel water-measure

4 Bushels 1 Comb or half Quarter

2 Combs 1 Quarter

5 Quarters 1 Wey

Salt and sea-coal are heaped or else there are five pecks to the bushel.

*In the Last are*

2 Weys

10 Quarters

80 Bushels

320 Pecks

1280 Pottles

2560 Quarts

5120 Pints

*In a Wey are*

5 Quarters

2 Weys

2 Weys 1 Last, or 10 Qrs.  
4 Fatts or Vatts, or 36 Bushels of sea-coals, 1 Chalder; and 21 Chalder is accounted a score in the river Thames

40 Bushels  
160 Pecks  
320 Gallons  
640 Pottles  
1280 Quarts  
2560 Pints

Note, By an act anno 1712, the bushel is 2178, cubic inches; and a gallon of this measure is 272½ cubic inches.

*Long Measure.*

3 Barley coorns 1 inch  
12 Inches 1 Foot  
3 Feet one Yard  
3 Feet 9 inches 1 Ell English  
5 Feet a geometrical Pace  
5 Yards and a half 1 Pole, perch, or rood

6 Feet 1 fathom or 2 Yards  
40 Poles or 220 yards, 1 Furlong  
8 Furlongs 1 Mile, or 1760 Yards  
3 Miles 1 League

*In a Mile are*

8 Furlongs  
320 Poles  
1760 Yards

5280 Feet  
63360 Inches  
190080 Barley-coorns

*Land Measure.*

5 Yards and a half, a pole, perch or Rood.  
48 Poles makes a Furlong, or Quarter of an Acre.  
160 Poles in Length, one in breadth, is one Acre.  
80 Poles in length, and two in breadth, one Acre; and  
40 Poles in length, and four in breadth, one Acre.  
4 Poles in length make one chain.  
10 Chains in length, and one in breadth, make one Acre.

*Time.*

60 Seconds, one minute  
60 Minutes, one hour  
24 Hours, one natural day  
7 Days, one week  
4 Weeks, one month  
13 Months, one day and 6 hours, one solar year

*In a Year are.*

31557600 Seconds  
525960 Minutes  
8766 Hours  
365 Days 6 hours.

Note, The year is also divided into 12 calendar months, which contains 365 days, according to this good old verse, viz.

Thirty days hath September, April, June, and November,  
February hath 28 alone, and all the rest have thirty-one.

**SUB.**

**SUBTRACTION.**

**T**HE next Rule in Arithmetic is Subtraction, (commonly but erroneously called Substraction,) and this rule teaches to take a lesser number out of a greater, and sheweth the remainder, excess, or difference.

Place the lesser number under the greater, with the same care, and in the same order as in addition,) draw a line under them, and beginning at the right hand, take each figure in the lower line from the figure under which it stands: but if the figure in the lower line is greater than in the upper, then in the numbers of one denomination ten must be borrowed, and added to the figure in the upper line; then take the figure in the lower line from the sum, and write down the remainder; but for every ten thus borrowed, one must be paid or added to the next left hand figure in the lower line.

Example. Suppose that Mr Andrews owes to Mr Baker the sum of 323 l. whereof Mr A. hath paid unto Mr B. 146 l. in part, what remains due to Mr B.?

Ans. 177 l.

Here the lesser number 146 stands under the greater 323, and to find the remainder, or sum remaining due I say, 6 from 3 I cannot, but 6 from 13, (for you borrow 10, and add to it the figure or cypher that stands directly over the figure you subtract,) and there remains 7, then 1 that I borrowed and 4 is 5, for as I borrow 10 in the inferior place, which is equal to one in the superior, so I must now pay the same; therefore I say 5 from 2 I cannot, but 5 from 12, borrowing 10, and adding it to the figure 2, as above directed, there remains 7 then 1 that I borrowed and 1 is 2, from the third figure above it, and there remains 1, and so the example is done; and by it is shewn that A still owes B 177 l. For a proof of its verity, add 177 the remainder, to 146 the lesser of the two given numbers, and it will make 323, being the same with the greater number, or sum of money first due; and therefore is a sure proof of the truth and certainty of the rule. And as subtraction is proved by addition, so may addition be proved by subtraction; for if the two aforesaid numbers, viz. 323 and 146, are added, their total is 469; from which if you deduct 146, the remainder will be the greater number; or if you subtract 323 from the said 469, the remainder will be 146, the lesser number.

All examples in subtraction of numbers of one denomination



tion are performed as above, they varying not at all; but however, once more, for the better explanation, admit a great sheep master hath in all 6904 sheep, and takes out of them 2490 to dispose of at market; how many doth he leave behind? To know this, set them down thus.

From 6904 the greater number,  
Take 2490 the lesser number.

Ans. 4414

Here I say 0 from 4, and there remains 4, then 9 from nothing (or 0) I cannot, but 9 from 10, (adding 10 to the 0,) and there remains 1; then 1 that I borrowed and 4 makes 5; and 5 from 9 and there remains 4; and lastly, I say 2 from 6 and there remains also four, (for I borrowed none, and therefore there is no occasion of paying;) so that he leaves behind him just 4414; which put to the number he takes to market, makes the number he first had, viz. 6904, and shews the deduction to be true, and the answer right.

*More Examples for Practice.*

| <i>l.</i>   | <i>Yards.</i> | <i>Gallons.</i> | <i>Pounds.</i> |
|-------------|---------------|-----------------|----------------|
| From 4796   | 3700          | 47200           | 479671         |
| Take 2929   | 1976          | 31976           | 97694          |
| <hr/>       | <hr/>         | <hr/>           | <hr/>          |
| Rem. 1867   | 1724          | 15224           | 381977         |
| <hr/>       | <hr/>         | <hr/>           | <hr/>          |
| Proof. 4796 | 3700          | 47200           | 479671         |

The distance of time, since any remarkable event, may be found, by subtracting the date thereof from the date of the present year.

*Examples.*

- I. 1788  
1666 the fire of London  

---

Since 122 years,
- III. 1788.  
1605 gun powd. trea-  

---

(30n.
- II. 1788  
1588 the Spanish invasion.  

---

Since 200 years.

*Subtraction of Divers Denominations.*

Here if the figure or figures placed in the lower line exceed those in the upper, then as many units must be borrowed

'ed as make an unit, or 1, of the next superior denomination; and one must be carried to the next left hand place in the lower line as before.

*Of money.*

|           | l. | s. | d. |
|-----------|----|----|----|
| Due       | 9  | 2  | 6  |
| Paid      | 6  | 16 | 4  |
| <hr/>     |    |    |    |
| Rests due | 2  | 6  | 2  |

|             | 10  | 20 | 124 |
|-------------|-----|----|-----|
|             | l.  | s. | d.  |
| Sold for    | 242 | 16 | 3½  |
| Pd. in part | 174 | 12 | 6½  |
| <hr/>       |     |    |     |
| Answer      | 68  | 3  | 9½  |

Suppose Mr Champion owes Mr Darnel 9l. 2s. 6d. and Mr C. hath paid Mr D. in part 6l. 16s. 4d. what remains due to Mr D. Ans. There is due to Mr Darnel 2l. 6s. 2d.

Again Mr Edwards sells to Mr Francis Spanish wool to the value of 242l. 16s. 3½d. and pays present money, the sum of 174l. 12s. 6½d.; what money remains unpaid from Mr F. Ans. 68. 3s. 9½

In the first of these examples, I say, 4 from 6, and there remains two, then 6, from 2 I cannot, but borrowing one integer of the next denomination, or one pound, which is 20, I say 16 from 20 and there remains 4, and adding it to the number 2, it makes 6; wherefore I put down 6 in the place of shillings, and say, 1 that I borrowed and 6 is 7; now from 9 there remains 2; so the money resting due to Mr Darnel is 2l. 6s. 2d. as in the example.

In the second example, I say, 2 farthings (or an halfpenny) from 3 farthings and there remains 1, which I set down in its proper place, viz. under the denomination of farthings; then 6 from 3 I cannot, but 6 from 12 (as marked over the denomination) and there remains 6, and 3 over it makes 9, which I place under the line in its right place, viz. of pence; then 1 that I borrowed, (that is one shilling) and 12 is 13; 13 from 16 and there rests 3, which I likewise set down under its own rank; then 4 from 2 I cannot, but 4 from 12 (borrowing ten) and there rests 8; then 1 that I borrowed and makes 8; 8 from 4 I cannot, but 8 from 14, and there remains 6: so that the sum remaining due is 68l. 3s. 9½d. as in the work. For its proof, you must add the said remaining sum to the lesser or under sum 174l. 12s. 6½d. and it makes 242l. 16s. 3½d. the sum first due, and is a proof of the work being right.

More Examples for Practice.

|         | l.  | s. | d.              | l.  | s. | d. | l.   | s. | d.              |
|---------|-----|----|-----------------|-----|----|----|------|----|-----------------|
| Due     | 147 | 16 | 6 $\frac{1}{2}$ | 74  | 10 | 4  | 2471 | 7  | 0               |
| Paid    | 97  | 13 | 4 $\frac{1}{4}$ | 29  | 12 | 9  | 1976 | 16 | 6 $\frac{1}{2}$ |
| Remains | 77  | 3  | 2               | 44  | 17 | 7  | 494  | 10 | 5 $\frac{1}{2}$ |
| Proof   | 174 | 16 | 6 $\frac{1}{2}$ | 74  | 10 | 4  | 2471 | 7  | 0               |
| st Due. | 74  | 0  | 0               | 274 | 16 | 6  | 796  | 0  | 0               |
| Paid    | 46  | 12 | 10              | 197 | 19 | 4  | 279  | 11 | 7               |
| Balance | 37  | 7  | 2               | 76  | 17 | 2  | 516  | 8  | 5               |
| Proof   | 74  | 0  | 0               | 274 | 16 | 6  | 796  | 0  | 0               |

Sometimes a sum owing may be paid at several times; then the several payments must be added together, and their total deducted from the sum first due, as in this and the examples following

Owing 266l.

|               |    |
|---------------|----|
| Paid at times | 20 |
|               | 15 |
|               | 30 |
|               | 90 |
|               | 17 |
|               | 24 |
|               | 60 |

Paid in all 256 ded.  
Rests due 10

Proof 266

|                           | l.  | s. | d. |                         | l.  | s. | d. |
|---------------------------|-----|----|----|-------------------------|-----|----|----|
| More due                  | 249 | 12 | 0  | Received                | 100 | 10 | 0  |
| Received at several times | 24  | 12 | 6  | Paid to several persons | 6   | 16 | 0  |
|                           | 9   | 14 | 9  |                         | 10  | 06 | 0  |
|                           | 20  | 00 | 0  |                         | 5   | 12 | 6  |
|                           | 16  | 16 | 6  |                         | 20  | 10 | 0  |
|                           | 22  | 10 | 2  |                         | 6   | 09 | 6  |
|                           | 13  | 12 | 6  |                         | 9   | 08 | 6  |
|                           | 7   | 16 | 4  |                         | 7   | 12 | 6  |
| Received in all           | 115 | 02 | 9  | Paid in all             | 67  | 09 | 0  |

Rests due 134 09 3

Remains in the bag } 33 01 0

Proof 249 01 0  
G

Avoir-

*Avoirdupois Weight..*

|       | 100   | 20 | 4    | 28  | 10  | 4    | 28  | 12  | 16  | 16  |
|-------|-------|----|------|-----|-----|------|-----|-----|-----|-----|
|       | Tens. | C. | grs. | lb. | C.  | grs. | lb. | lb. | oz. | dr. |
| From  | 44    | 12 | 1    | 10  | 246 | 2    | 12  | 146 | 02  | 10  |
| Take  | 39    | 14 | 2    | 66  | 164 | 3    | 22  | 97  | 10  | 12  |
|       | 4     | 17 | 3    | 04  | 81  | 2    | 18  | 48  | 07  | 14  |
| Proof | 44    | 12 | 1    | 10  | 246 | 2    | 12  | 146 | 02  | 10  |

*Troy Weight.*

|        | 10  | 12  | 20   | 24  | 10   | 20   | 24  |
|--------|-----|-----|------|-----|------|------|-----|
|        | lb. | oz. | dwt. | gr. | oz.  | dwt. | gr. |
| From   | 462 | 04  | 10   | 11  | 1247 | 10   | 12  |
| Take   | 196 | 09  | 06   | 16  | 976  | 16   | 17  |
| Remain | 265 | 07  | 03   | 19  | 270  | 13   | 19  |

Proof 462 04 10 11

1247 10 12

And so much for subtraction; which method will serve for any denomination whatever, having respect to the several Tables of quantity, as before hinted in Addition.

**MULTIPLICATION.**

**T**HE next rule in order is Multiplication, and perhaps the most serviceable rule in business, for its quick dispatch, of all others in Arithmetic; which I shall endeavour to shew by its nature, quality, and use. Now,

1 Multiplication is a rule that by two numbers given, teacheth to find out a third, which shall contain either of the two as many times as the other containeth an unit.

2. Multiplication is also a compendious working of Addition.

3. It serves likewise to bring great denominations into small as pounds into shillings, pence, and farthings.

4. Having the length and breadth of a plane surface, we find its contents in superficial or square measure.

5. By multiplication we find, having the value of one thing or the wages of one person, how to know the value of many such things, or the wages of many such persons.

In Multiplication we are particularly to take notice of these three terms, viz.

Mul.



The  $\left\{ \begin{array}{l} \text{Multiplicand,} \\ \text{Multiplier, and} \\ \text{Product.} \end{array} \right.$

1. The multiplicand (generally the greater of the two numbers) is the number to be multiplied.
2. The multiplier (generally the lesser of the two numbers) is the number by which the former is to be multiplied.
3. The product is the result of the work; or answer.

The Multiplier and Multiplicand, are collectively called, Factors

But before any procedure can be made in this Rule, it is necessary to have the following Table by heart and that very perfectly.

The MULTIPLICATION TABLE.

| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9   | 10  | 11  | 12  |
|----|----|----|----|----|----|----|----|-----|-----|-----|-----|
| 2  | 4  | 6  | 8  | 10 | 12 | 14 | 16 | 18  | 20  | 22  | 24  |
| 3  | 6  | 9  | 12 | 15 | 18 | 21 | 24 | 27  | 30  | 33  | 36  |
| 4  | 8  | 12 | 16 | 20 | 24 | 28 | 32 | 36  | 40  | 44  | 48  |
| 5  | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45  | 50  | 55  | 60  |
| 6  | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54  | 60  | 66  | 72  |
| 7  | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63  | 70  | 77  | 84  |
| 8  | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72  | 80  | 88  | 96  |
| 9  | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81  | 90  | 99  | 108 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90  | 100 | 110 | 120 |
| 11 | 22 | 33 | 44 | 55 | 66 | 77 | 88 | 99  | 110 | 121 | 132 |
| 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |

This table is so plain and easy, that there is no need of direction; for the product of any two figures will be found in that square, which is on a line with the one, and under the other; thus 54, the product of 6 and 9, will be found on a line with 6, and under 9, or on a line with 9 and under 6; so 7 times 8 is 56, and 8 times 7 is 56, &c. And thus: 2

Table ought to be got by heart, for the more dextrous readiness in multiplying

Now for Application.

**Example 1.** How many are 3 times 472; which being set down in the margin, I say, 3 times 2 is 6; which place under 3 the multiplier: then 3 times 7 is 21; set down 1 under 7, and carry 2 for the two tens, as in addition of one denomination, then 3 times 4 is 12, and two carried is 14; which set down, and the product is 1416; that is, 3 times 472 makes so much; which may be proved by Addition, by setting down 472 three times, in additional order, and casting it up, which makes the assertion good in the second definition, that this Rule compendiously performs the office of Addition. Likewise the foregoing Example agrees with the first definition; for as 3 times 472 makes 1416, so doth 472 times 3 make the same, viz. 1416.

**Example 2.** Again; how many are produced by multiplying 742 by 4?

742 Multiplicand  
4 Multiplier  
-----  
2968 Product

Here I say, 4 times 2 is 8, and 4 times 4 is 16; 6 add carry 1; and 4 times 7 is 28, and one is 29, which set down; so that the whole product is 2968, as appears by the work.

More examples of one figure in the multiplier are these viz.

|            |       |       |       |        |        |
|------------|-------|-------|-------|--------|--------|
| Multiplie. | 7420  | 4444  | 7460  | 90704  | 56789  |
|            | 5     | 6     | 7     | 8      | 9      |
| Product    | 37100 | 26664 | 52210 | 725632 | 511101 |

*Compound Multiplication.*

Is when the Multiplier consists of two, three, four, or more figures or cyphers.

And here you must begin with that figure which is in the place of units in the multiplier; then go through the whole multiplicand, by multiplying each figure of it by that said unit figure, then by the next, to wit, by the figure in the place for tens in the multiplier; then with the third, &c. to the last; always remembering to place the first figure of every product or line, (for you will ever have as many as you have significant figures in the multiplier) I say, remember to place the first figure of each line exactly and perpendicularly under the figure you multiply by, and then add the several lines or products together, which collected give the total product required, as in the following, viz.



Example

**Example 1.** How many are 23 times 7426? First I begin with the unit figure 3 in the multiplier, saying 3 times 6 is 8; 8 (which I set directly under 3, by which multiply) and carry 1; then 3 times 2 is 6, and is 7; then 3 times 4 is 12; 2 and carry 1; then times 7 is 21, and one is 22; and so I have done with the first figure of the multiplier, viz. 3. Then I go to the next, that is 2, and twice 6 is 12; 2 and I carry 1, (which 2 is placed in a direct line under 2, the multiplying figure; then twice 2 is 4, and 1 is 5; then twice 4 is 8, and lastly, twice 7 is 14, which I set down; then I add the two products together, saying 8 is 8, &c. and the total is the true product, or result of the multiplication, viz. 170793. Again,

**Example 2.** What is the product  
Multiplied by

527527  
285

It will appear too prolix, and altogether unnecessary, to give more verbal directions; nay, indeed, nauseous tautology, since those given above are sufficient; and therefore the learner is referred to the observation of the example, as also to those two that follow, viz.

527535  
15728

275827  
19725

4220280  
1055070  
3692745  
2637675  
527535

1379135  
551654  
1930789  
2482443  
275827

8297070480

5440687575

When cyphers are intermixed with figures in the multiplier, then multiply by the figures as above; and when you come to a cypher in the multiplier, then set down another cypher exactly and perpendicularly under it, then begin the multiplication again with the next figure to the cypher in the multiplier, and go through it in the same line, placing the first figure in that product next to the cypher towards the left hand, but then heed must be taken that the next figure or cypher of the next line must be set down one degree farther towards the left hand, and not immediately under the

last figure set down to the cypher; as in the following examples may be fully understood.

|        |             |           |
|--------|-------------|-----------|
| 24393  | 7864371     | 32586     |
| 402    | 23604       | 6030      |
| <hr/>  | <hr/>       | <hr/>     |
| 48786  | 31457484    | 9827580   |
| 95720  | 471862260   | 19655160  |
| <hr/>  | 23593113    | <hr/>     |
| 980596 | 15728742    | 197534380 |
|        | <hr/>       |           |
|        | 18630613084 |           |

When you have a cypher or cyphers in the multiplier at the beginning towards the right hand, then set it or them backwards from the place of units towards the right hand; and when you have multiplied by the figure or figures, annex the cypher or cyphers: As in these examples.

|        |          |          |
|--------|----------|----------|
| 4762   | 47962    | 4632     |
| 70     | 400      | 2600     |
| <hr/>  | <hr/>    | <hr/>    |
| 333340 | 19184800 | 27792    |
|        |          | 9264     |
|        |          | <hr/>    |
|        |          | 12043200 |

If you have cyphers both in the multiplicand and multiplier then neglect the cyphers in both, and multiply by the figures, and annex the cyphers at last; As in these examples.

|         |           |          |
|---------|-----------|----------|
| 42600   | 42300     | 376400   |
| 220     | 12000     | 2400     |
| <hr/>   | <hr/>     | <hr/>    |
| 852     | 846       | 15056    |
| 852     | 423       | 7528     |
| <hr/>   | <hr/>     | <hr/>    |
| 9372000 | 507600000 | 90360000 |

When you are to multiply by 10, 100, 1000, 10,000, it is only annexing so many cyphers to the multiplicand, that is either 1, 2, 3, or 4 cyphers, and the work is done.

Example. Suppose I am to multiply 375 by the numbers above; if I intend to multiply it by 10, then I join 0 to 375 and then it makes, or the product is, 3750; If by 100, then I annex 00, and then it makes 37500: If by 1000, I put 000, and then it produces 375000: And lastly, if by 10,000 I then add 0000, and then it makes 3750000, &c. And thus may any number be multiplied when the multiplier consists of an unity with any number of cyphers, and done by inspection only.



only, without any formal setting down the multiplicand with a line drawn under it, &c.

Thus far for direction in the manner how to multiply the next will be to shew the uses of multiplication in real business, and how to apply it on proper occasions, viz.

1. Suppose you want to know how many half crowns there are in 246l. you know that 8 half crowns make 1l. wherefore set them down thus:

$$\begin{array}{r} 246 \text{ l.} \\ \text{Multiply by } 8 \\ \hline \end{array}$$

Answer 1968

Again, in 1968 half crowns, how many pence?  
30 pence in half a crown.

59040 pence, the answer.

And this serves to make out, that great denominations are brought into smaller by this rule, according to the third definition.

2. Admit you wanted to know the contents of a large Shuffle-board table, 34 feet long, and 4 feet wide, multiply 34 the length, by 4 the breadth, and the answer will be 136, square feet for the true content of such a table. And this agrees with the fourth definition of this rule.

3. If I know the value of a yard of broad cloth to be 12 shillings, what is the value of 220 yards of the said cloth in shillings?

$$\begin{array}{r} 220 \\ \text{Multiply by } 12 \\ \hline 440 \\ 220 \\ \hline \end{array}$$

2640 shillings, or 132 pounds:

If the wages of one Seaman be 23 shillings a month, what is the wages of 250 seamen for the same time?

$$\begin{array}{r} 250 \\ \text{Multiply by } 23 \\ \hline 750 \\ 500 \\ \hline \end{array}$$

Answer 5750 shillings, or 287l. 10s.

And these two examples accord with the fifth definition, or use of this rule,

And thus much for common Multiplication.

I shall in the next place, say some small matter concerning

ing multiplication of money, and a little of its use, and so conclude this rule.

### *Multiplication of Money.*

Multiplication of money (what most should learn above any thing) hath great affinity with Addition of money; the same method being taken in carrying from one denomination to the next, viz. from farthings to pence, from pence to shillings, and from shillings to pounds. And as in Addition, (and other Multiplication) you begin at the right hand, and proceed towards the left; so here you begin at the least denomination, which is also at the right hand.

This method of accounting is the most apt and expeditious of all others, for small quantities; and therefore extremely necessary in making bills of parcels, &c. And is beyond all contradiction, as sure and certain as any way whatsoever.

### *The General Rule.*

Is always to multiply the price by the quantity.

The first step is, for quantities from 2 to 12; and this is done by one multiplier; as in the examples following,

Example 1. Multiply  
(or 6 pieces of cloth at 7l. 12s. 6d. per piece) by

| l.    | s. | d. |
|-------|----|----|
| 7     | 12 | 6  |
| <hr/> |    |    |
|       |    | 6  |

Here I say 6 times 6 is 36 pence, which is just 3s. I set down 0 in the place of pence, and carry 3s. to the place of shillings, (exactly the same as in addition of money,) then 6 times 12 is 72, and 3 is 75s. or 3l. 15s. wherefore I set down 15 in the place of shillings, and carry 3 to the pounds; then 6 times 7 is 42 and 3 is 45l. So the whole amount of the 6 cloths, at 7l. 12s. 6d. per cloth, is 45l. 15s. as in the work, which is very concise.

Example 2. Again, how much is 9 times 0  
or what is the amount of 9 merks?

| l.    | s. | d. |
|-------|----|----|
|       | 13 | 4  |
| <hr/> |    |    |
|       |    | 9  |

In this example I say, 9 times 4 is 36 or 3s. I set down 0, and carry 3; then 9 times 3 is 27, and 3 makes 30; I set down 0 and carry 3 (as in multiplication of simple numbers:) then 9 times 1 is 9, and 3 is 12; which is in the place of tens of shillings, and being halved makes just 6l, and so much is the value of 9 merks,

Example

Example 3. Once more: What comes 12 gallons of Wine to at 5s. 4d. per gallon?

Here I say, 12 times 4 is 48; 0 and carry 4; then 12 times 5 is 60, and 4 is 64s. or 3l. 4s. &c.

$$\begin{array}{r} 0 \ 5 \ 4 \\ \times 12 \\ \hline 3 \ 4 \ 0 \end{array}$$

The next degree or step of advance in this way of reckoning, is of quantities exceeding 12, even to 12 times 12 or 144; all which, as far as 144, are found in that excellent table, the Table of Multiplication; which is a ready help to all purposes of reckoning, and particularly in this way; and that you may proceed with dexterity, you must be very ready in the said Table, that you may be immediately apprehensive what component parts hit your quantity proposed, or pretty near it (for any quantity below 12 needs no recollection at all, as in two of the examples above) and then work accordingly; if the quantity be 15 yards, I readily know that 3 times 5 is 15; and therefore 3 and 5, or 5 and 3 are to be my multipliers: if the quantity were 21, then 3 and 7, or 7 and 3, would be my multipliers: if 30, then 5 and 6, or 6 and 5; also 3 and 10, or 10 and 3: if 45, 48, 56, 66, 72, &c. were the quantities, then 5 and 9, 6 and 8, 7 and 8, 6 and 11, 6 and 12, and 8 and 12, &c. are to be multipliers, and exactly hit the several quantities of which they are component parts; and examples of this kind have two multiplications for their solution.

When the quantity proposed is a number irregular, or such a number that no two numbers in the Table can be found to answer it, then we must multiply by two such numbers as come pretty near it, as is said before: and for the number wanting, to make up the number or quantity proposed, multiply the given price of one by the number that is wanting which will make three products by three multiplications; which last product must be added to the foregoing products resulting from two multiplications, and the total will be the answer.

And first, I shall shew examples of the second step, viz. of regular quantities that exceed 12, and are precisely answered at two multiplications, such as mentioned above, viz.

What comes 15 yards of muslin to at 3s. 5d. per yard?

Here 3 times 5 is 15d. or 1s. and 3d. 3 and carry 1s. then 3 times 3 is 9, and 1 is 10s, so the first product is 10 4d, which I multiply by 5, saying 5 times 3 is 15d. or 1s. 3d. 3 and carry 1; then 5 times 10 is 50, and 1 is 51s. or 2l. 11s. So the amount of 15

$$\begin{array}{r} 0 \ 3 \ 5 \\ \times 3 \text{ and } 5 \\ \hline 0 \ 10 \ 3 \\ \times 5 \\ \hline 2 \ 11 \ 3 \end{array}$$

yards

yards at 3s. 5d. per yard, is 2l. 11s. 3d. And demonstrable thus: If 10s. 3d. be the value of 3 times 3s. 5d. then 5 times the value of 10s. 3d. must of necessity be 15 times the value of 3s. 5d. because 5 times 3 is 15; and its truth may be proved by Addition and multiplication, thus: set down 3s. 5d. three times in additional order, and put the three lines together, and the total of them multiply by 5. as before, and the answer will be the same. Or set down 17s. 1d. (the product of 3s. 5d. multiply by 5.) three times also, and add them together, and the total will be exactly the same with the result by Multiplication; as in the following specimens of work.

$$\begin{array}{r}
 \text{(1)} \\
 \begin{array}{r}
 \text{l. s. d.} \\
 0 \quad 3 \quad 5 \\
 0 \quad 3 \quad 5 \\
 0 \quad 3 \quad 5 \\
 \hline
 0 \quad 10 \quad 3 \\
 \phantom{0} \quad \quad 5 \\
 \hline
 2 \quad 11 \quad 3
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 \text{(2)} \\
 \begin{array}{r}
 \text{l. s. d.} \\
 0 \quad 3 \quad 5 \\
 \phantom{0} \quad \quad 5 \\
 \hline
 0 \quad 17 \quad 1 \\
 0 \quad 17 \quad 1 \\
 0 \quad 17 \quad 1 \\
 \hline
 2 \quad 11 \quad 3
 \end{array}
 \end{array}$$

Here the first of these two proofs is worked by Addition and Multiplication, and the second by multiplication (as per margin) and Addition. Also,

By this we see, that in all examples under this head, we are to pitch on two numbers (for multipliers) in the table; which multiplied together, make the quantity proposed; and then we are to multiply the price by one of the numbers (it matters not by which first) and then that product is to be multiplied by the other number, and the second or last product will be the answer.

Example 2. Again, what is the value of 21 gallons of Brandy at 7s. per gallon?

In this example I say, 7 times 9 is 63d. or 5s. 3d. I set down 3 and carry 5; then 7 times 7 is 49, and 5 is 54s. or 2l. 14s. So the first product is 2l. 14s. 3d. which I multiply by 3. and that produces the last product or answer, viz 8l. 2s. 9d.

$$\begin{array}{r}
 0 \quad 7 \quad 0 \\
 \phantom{0} \quad \quad 7 \quad 8 \quad 3 \\
 \hline
 2 \quad 14 \quad 3 \\
 \phantom{2} \quad \quad 3 \\
 \hline
 8 \quad 02 \quad 9
 \end{array}$$

Now follow a few more examples of this sort, without any verbal directions, because I think those already given to be sufficient.

Example.



Example 3.

What comes thirty ells  
of Holland to, at

0 3 7 per ell.  
10 and 3

---

1 15 10

---

3

---

5 7 6 Ans.

Example 5.

56 bushels of Wheat.

0 4 9  
7 and 8

---

1 13 3

---

8

---

13 06 0

Example 7:

108lb of Indigo Lahore.

0 7 8  
9 and 12

---

3 9 0

---

12

---

41 8 0

Example 4.

45 pounds of raw Silk, at

0 15 6 per lb.  
5 and 9

---

3 17 6

---

9

---

34 17 6

Example 6.

72 broad pieces.

1 3 6 each.  
12 and 6

---

14 02 0

---

6

---

84 12 0

Example 8.

56 Cwt. of Currants

2 13 6 per C.  
8 and 12

---

21 8 0

---

12

---

256 16 0

The next gradition of advance is of quantities irregular or of numbers that are not to be answered precisely at two multiplications. In this case there ariseth no increase or difficulty, but it is as easy as the example foregoing: Only here you will have an addition of one line more, occasioned by bringing down the price of one to be added to the last product: or else a line more, made by multiplying the price by what is defective or wanting in the number by two multiplications, to make up the proposed quantity complete; as it may be of 2, 3, 4, 5, &c as by the subsequent examples may be seen and understood.

Example 1. What is the product of 21, 13s 6d, multiplied by 39?

Here

Here I find that 6 multiplied by 6, makes 36; which is exactly within 3 of the quantity proposed; wherefore I multiply by 6, and that product again by the other 6; the last product is 96l. 6s. which is the value of 36; but we want to know the value of 39, wherefore I multiply the price of one, viz 2l. 13s. 6d. by 3 that is defective or wanting to make up 36 to 39, saying, 3 times 6 is 18l. 8s. And finding that 3 times 2l. 13s. 6d. is 8l. 6s. and 6d. which added to 96l. 6s. 0d. the total gives the complete value of 39 for 36 and 3 makes 39. See the work on the margin.

$$\begin{array}{r}
 2 \quad 13 \quad 6 \\
 \hline
 16 \quad 01 \quad 0 \\
 \hline
 96 \quad 06 \quad 0 \\
 8 \quad 00 \quad 6 \\
 \hline
 104 \quad 06 \quad 6
 \end{array}$$

**Example 2.** What comes 79 cwt of Cheese to at 28s. per cwt.

$$\begin{array}{r}
 1 \quad 8 \quad 0 \\
 \hline
 9 \quad 16 \quad 0 \\
 \hline
 107 \quad 16 \quad 0 \\
 32 \quad 16 \quad 0 \\
 \hline
 110 \quad 12 \quad 0
 \end{array}$$

In this example I say, 7 times 0 is 0, then 7 times 8 is 56, which is 2l. 16s. set down 16 and carry 2: then 7 times 1 is 7, and 2 l carried makes 9. So the first product is 9l. 16s. 0d. and multiply by 11, produces 107l. 16s. 3d. or the value of 77; then for 2 wanting I multiply the price by it, and that gives 2l. 16s. 0d. which added to 107l. 16s. 0d. makes the value of 79, viz. 110l. Or, no 12s. 0d. as per work: pence being in the price, you may multiply 28s. by 79, without bringing it into pounds as you work it, but omit it till the last, and then cut off or separate the last figure or cypher of the product towards the right hand, and half those towards the l. ft. which half will be pounds, and the figure cut off shillings; as in this example.

$$\begin{array}{r}
 28 \text{ s.} \\
 79 \\
 \hline
 252 \\
 196 \\
 \hline
 221 \text{ 2}
 \end{array}$$

The half of 2 is 1, the half of 2 is 1, and the half of 1 is 0 which 1 joined to the 2 severed from 22, 1 makes 12; so the answer is 110l. 12s. as before.

**Example**

Example 3. For 112 pounds of sugar at  $5\frac{1}{2}$ . per lb. set down thus :

$5\frac{1}{2}$  per lb.  
10 and 10

4 07  
10

2 05 10  
05 06 the product  $5\frac{1}{2}$ d. by 12 defective.

2 11 04 the answer.

Here, after I have multiplied by 10 and 10, the parts of 100, there wants 12, wherefore I multiplied  $5\frac{1}{2}$ . by 12, and it gives 5s. 6d. for 12lb. at  $5\frac{1}{2}$ d. which added to 2l. 5s. 10d. the value of 100, makes 2l. 11s. 4d. the due value of 112 lb at  $5\frac{1}{2}$ d. per lb.

Example 4. 94 stone of Beef, at 22d. or 1s. 10d. per stone.

1 10  
10 and 9

18 04  
9  
8 05 00  
07 04

8 12 04 Answer.

Example 5. 79 $\frac{1}{2}$  Cwt. of Raisins.

1 05 06 per C.  
9 and 10

11 09 06  
10

114 15 00  
8 18 06

0 12 09 for  $\frac{1}{2}$  C.

124 06 03

Here what is wanting after the two multiplications, is 4; wherefore I multiply 1s. 10d. (the price) by 4, which produces 7s. 4d. to be added, &c.

After I have multiplied by 9 and 10, I multiply the price 25s. 6d. by the quantity wanting and it produces 8l. 18s. 6d. then for the half cwt. I take half of the price, which is 12s. 9d. and then collect the three lines, the total of which is 124l. 6d. 3d. for the answer.

Note, From the last example may be observed, that there is no need of too much solicitude concerning coming so very near by two multiplications; for there 7 is wanting to make up the true quantity; nay, if the two multiplications be short

by 10 or 12, it is near enough; for it is as easy to multiply the price by 10 or 12, as by 3 or three, and the addition is the same.

Example 6. Once more; What comes 110 cwt. 3 qrs. of Hops to at 4l. 10s. 6d. per cwt.?

4 10 06  
10 and 10

45 05 00  
10

452 10 00

45 05 00

2 05 03

1 02 07½

501 02 10½ Ans.

After having multiplied by 10 and 10, which makes a 100, I multiply the Price 4l. 10s. 6d. by 10 that is wanting which gives the same with the first product, viz. 45l. 5s. 0d. which stands under the product by 100, and for the ½ of 1 cwt. I take ½ of the price, viz. first the half, and then, the half of that half, that is 2l. 5s. 3d. and 1l. 2s. 7½d; which four lines added together, make 501l. 2s. 10½. for the answer.

*To prove Multiplication.*

Whether of simple numbers or of money, it is most surely done by division: but before that is known, take this method viz. As you multiplied the multiplicand by the multiplier, so contrariwise multiply the multiplier by the multiplicand, and if the products are alike, the work is right; or otherwise one of them is wrong, and must be gone over again till they do agree.

Example 1 365 days in a year.  
24 hours in a day.

1460

730

8760

Here (reversely) I say, 5 times 4 is 20, 0 and carry 2; 6 times 4 is 24, and 2 is 26, 6 and carry 2; and 3 times 4 is 12, and 2 is 14. Then 5 times 2 is 10, 0 and carry 1; 6 times 2 is 12 and 1 is 13, 3 and carry 1; 3 times 2 is 6 and 1 is 7. Which products, added together, make 8760 the hours in a year, without taking in the odd 6 hours which the year doth consist of more than 365 days.

Example



Example 2.

56 gallons of spirits  
at 3s. 2d. per gal.  
7 and 8

1 02 2  
8

8 17 4 Answer.

I say here, twice 7 is 14, 2 and carry 1s. and three times 7 is 21, and 1 is 22s. or 1l. 2s. Again, twice 8 is 16d. 4 and carry 1s. and twice 8 is 16, and 1 is 17s. 17 and carry 0; and once 8 is 8l. Thus both these examples are the same in consequence as if you proceeded in the common and regular method of multiplication and shews the truth of

the operation.—The next rule in order is

### DIVISION.

**T**HIS Rule, though accounted the hardest lesson in Arithmetic, yet I shall make it easy and intelligible to the meanest capacity.

The use of this Rule is to know how many times one number or sum is contained in another; as if it were asked, how often is 9 contained in 54? the answer is 6 times; or how many times 12 is there in 144? answer 12 times.

As by Multiplication great names or denominations are brought into small, so contrarily by Division, small names are brought into greater; as farthings (from one gradation to another) into pounds, pounds weight into tons weight, and gallons liquid into tons liquid, &c.

In this rule we are to take particular notice of these three certain terms following, viz.

1. } Dividend, or number to be divided.
2. } The Divisor, or number by which we divide.
3. } Quotient, or answer to the work; which shews how often the Divisor is contained in the dividend.
4. The Remainder: which is an uncertain branch of this Rule, because there is sometimes a remainder, and sometimes not. And you must particularly note, That the remainder is ever of the same name with the dividend, and is always less than the divisor: for if it be more, or equal to the divisor, the work is wrong.

Division is either single or compound; single, when the divisor consisteth of 2 single figure, and the dividend of two at most; any of this sort is answered by the Multiplication Table; as if 63 were divided by 7, the answer will be 9 times. Here 63 is the dividend, 7 the divisor, and 9 the quotient or answer.

Compound division is when the dividend has many, or

more figures or cyphers than two, and the divisor one or more figures or cyphers, &c.

Example. How many times 7 is there contained in 365? Or how many weeks in a year?

|                            |               |            |
|----------------------------|---------------|------------|
|                            |               | 7) 365 (52 |
| A general rule for working |               | 35         |
| Note                       | 1. Seek       | —          |
|                            | 2. Multiply.  | 15         |
|                            | 3. Subtract   | 14         |
|                            | 4. Bring down | —          |
|                            |               | (1)        |

Having set down the example with two crooked lines, or half parenthesis, one for the divisor and the other for the quotient, I begin according to the aforementioned general rule for working, by seeking or asking how often I can take 7 the divisor out of 36 the two first figures of the dividend, (for I cannot take 7 out of 3, the quotient, being never to begin with 0) and the answer is 5 times; wherefore I place 5 in the quotient, and multiply the divisor 7 by it, (as directed in the general rule) saying 5 times 7 is 35, which I place under 36, and then, thirdly, according to the said rule, I subtract 35 from 36, and there remains 1; to which I bring down the next or last figure of the dividend, viz 5, and then there is 15 for a new dividend, or dividuall to work upon; then I ask or seek again, how oft 7 may be taken in 15, and the answer is 2 times: wherefore I put two in the quotient next to the 5; by which two I also multiply the divisor 7, saying, twice 7 is 14; which I set down under 15, and subtract, and there remains 1, which I place between two semicircles thus, (1), as it stands in the work; where observe, that 365 is the dividend, 7 the divisor, 52 the quotient, or answer, and 1 the remainder: the quotient declares that 7 is contained in 365, 52 times, and 1 over, or remaining; which I set over the divisor thus  $\frac{1}{7}$ , and signifies that there is one seventh of a week, or 1 day, more than just 52 weeks in a year, or 365 days; which is easily to be found by collecting the days of each calendar month, as they stand in the almanack.

You may note, That the said  $\frac{1}{7}$  is properly what is called a fraction, or a piece or segment of the dividend: but of this hereafter.

Note also, That if there had been more figures or cyphers in the dividend, they must have all been brought down one by one at a time, (and never but one at a time) and after subtraction, set to the remainder; and if there remains 0, you must still bring down but one figure or cypher at a time;

and for every figure or cypher so brought down, there must be a figure or cypher placed in the quotient, according to the times you can take the divisor out of the several dividends you make, by bringing down a figure or cypher at a time out of the dividend, till all be brought down, and the work ended.

For a specimen, let us divide 8060 pounds of tobacco equally among 8 men.

8) 8060 (1007 quotient

8...

060

56

(4)

there remains 6; to which I bring down 0, the last of the dividend, and it makes 60; lastly, the eights in 60, 7 times, and 7 times 8 is 56, from 60, and there remains 4; so the quotient shews that each person must have 1007 pounds of tobacco for his share in the dividend 8060, and there remains 4 pounds over and above, which makes half a pound more due to each man, because 4 the remainder is half of 8 the divisor; and so the work is done, the quotient given to each man 1007 pounds and a half, for his equal share.

Note, that in the operation, every time that you bring down a figure or cypher, you are to make a point under it in the dividend, to signify that such a figure or cypher hath been brought down and done with, as may be observed in the foregoing example.

Though this way of working is plain and easy to be understood, yet it is somewhat tedious; and therefore I shall shew a quicker way for dispatch when the divisor is a single figure; as shall be made conspicuous in these examples following, viz.

4) 78906

5) 34567

6) 29702

Quotient 19726(2)

6913(2)

4950(2)

Proof 78906

34567

29702

In the first of these examples I say, the 4's in 7 once, and there remains 3, which is left as if placed before 8, the next figure in the dividend, make 38, then the 4's in 39 9 times 9 times 4 is 36, from 38, and there remains 2, which makes the next figure in the dividend 29; then the 4's in 29, 7 times: 7 times 4 is 28, from 29, and there remains 1; which makes 0, the next of the dividend, 10, and the 4's in 10

H 3

twice:

twice: twice 4 is 8, from 10, and there remains 2; which makes 6 the last figure in the dividend, 26; lastly the 4's in 26, 6 times, and 6 times 4 is 24, from 26, and there rests 2, the remainder: and so for the other two examples. And for proof of the work, (or of any other examples) multiply the quotient by the divisor, and take in the remainder in the first place of the units; and if the product be the same with the dividend, the division is right; for I say 4 times 6 is 24, and 2 the remainder, makes 26; 6 and carry 2, &c.

More Examples by a single figure.

$$\begin{array}{r} 3 \overline{)54321} \end{array}$$

$$\begin{array}{r} 7 \overline{)279060} \end{array}$$

$$\begin{array}{r} 9 \overline{)234567} \end{array}$$

$$\text{Quotient } 18107 (0)$$

$$\text{Quotient } 39865 (5)$$

$$\text{Quotient } 26063 (0)$$

$$\text{Proof } 54321$$

$$\text{Proof } 279060$$

$$\text{Proof } 234567$$

This is the shortest way of division that can be by a single figure.

As it is necessary for expedition to divide by 11 and 12, as by a single figure, to have the products in one line; divide as in these examples, viz.

$$\begin{array}{r} 11 \overline{)72646206} \end{array}$$

$$\begin{array}{r} 12 \overline{)76677240} \end{array}$$

$$\text{Quotient } 6604200 (6)$$

$$\text{Quotient } 6389770$$

11

12

$$\text{Proof } 72646206$$

$$\text{Proof } 76677240$$

$$\begin{array}{r} 11 \overline{)476273000} \end{array}$$

$$\begin{array}{r} 12 \overline{)42007400} \end{array}$$

$$\text{Quotient } 4329727 (3)$$

$$\text{Quotient } 350061 (8)$$

11

12

$$\text{Proof } 47627000$$

$$\text{Proof } 42007400$$

In the first of these examples I say, the 11's in 72, answer 6 times, &c. In the second I say, the 12's in 76, answer 6 times, &c. In the third, the 11's in 47, 4 times; 4 times 11 is 44, from 47, and there rests 3, &c. In the fourth I say the 12's in 42, 3 times; 3 times 12 is 36 from 42, and there remains 6, &c.

By being ready and dexterous in the examples above, you may expeditiously divide by these numbers, viz. 110, 120, 1100, 1200, &c. For it is but cutting off, or separating the cyphers from 11 and 12 (when these numbers happen to be divisors) and cutting off and separating the like number of figures

figure



figures or cyphers from the right hand of the dividend, and then divide the other figures or cyphers towards the left hand by 11 or 12, as it shall happen; as in the examples, viz.

Divide 34567 by 110, and 890123 by 120, and 98765 by 1100, and 678901 by 1203.

$$11 \overline{) 0) 3356,7}$$

$$12 \overline{) 0) 89012,3}$$

$$\text{Quotient } 11 \overline{) 00) 987,65} \quad 314 \frac{2}{11} \text{ or } \frac{3456}{110}$$

$$12 \overline{) 00) 6789,01} \quad 7417 \frac{1}{12} \text{ or } \frac{8901}{120}$$

$$89 \frac{1}{11} \text{ or } \frac{8901}{110}$$

$$565 \frac{1}{120}$$

When you divide by 10, 100, 1000, or 10,000; you have nothing more to do than to cut off, or to separate so many figures or cyphers of the dividend towards the right hand, as you have cyphers in the divisor, and those figures towards the left make your quotient; and those cut off towards the right the remainder,

### Examples.

Divide 123456789 by 10, 100, 1000, 10,000.

By 10 the quotient is 12345678, and the remainder 9.

By 100 the quotient is 1234567, and the remainder 89.

By 1000 the quotient is 123456, and the remainder 789.

By 10,000 the quotient is 12345, and the remainder 6789.

When the divisor consisteth of several figures, then there ariseth a little more difficulty in the work; but if the following directions are heedfully attended to, the seeming difficulty is easily overcome; as in the succeeding example, viz.

Suppose I am to divide 78901 pounds among 32 parishes; or suppose an assessment of so much money was laid on so many parishes; what must each parish pay by an equal proportion towards the raising such a supply?

Divisor 32) 78901 ( . . . . Quotient.

The Example thus set out, I begin at the left hand, seeking how often I can take 32 out of 78: or more easy, how many times 3 there is in 7, and the answer is 2 times; which I place in the quotient thus 32) 78901 (2 and then according to the general rule of working, I multiply the divisor 32, by the 2 placed in the quotient, saying twice 2 is 4, and twice 3 is 6, and so there is 64 to be taken out of 78, which should stand thus:

$$32 \overline{) 78901} \begin{array}{r} 2 \\ 64 \end{array}$$

$$14$$

Then

Then I make a point under 9, the third figure of the dividend, and bring it down to the remainder, 14, and then the work appears thus:

$$\begin{array}{r} 32) 78901 (2 \\ 64 \end{array}$$

149.

Seeking again, I ask how many times 32 in 149; which is not readily to be answered; but how many times 3, the first figure of the divisor, is there in 14, the two first figures of the dividend 149 and the answer is 4 times; wherefore after placing 4 in the quotient, I multiply (as directed in the general rule) the divisor 32, by the said 4: saying, 4 times 2 is 8, placing it under 9 in the dividend: then 4 times 3 is 12, which set down under 14: so there is 128 to be taken out of 149, and then the work appears thus:

$$\begin{array}{r} 32) 78901 (24 \\ 64 \end{array}$$

$$\begin{array}{r} 149 \\ 128 \\ \hline \end{array}$$

210

And after subtraction there remains 21; then I make a point under 0 in the dividend, and bring it down to the right of the remainder 21, and then there is 210, for a new dividend; then, as the general rule directs, I seek again, saying, how many times 32, the divisor, is there in 210 the dividend? or easier, how many times 3 in 21? But observe well that whenever you have a place more in the dividend than in the divisor, then always seek how oft you can take the first figure of the divisor out of the first 2 of the dividend, and the answer is 7 times; but it will not bear 7 times, for 7 times 32 is 224, and you cannot take 224 out of 210 or rather you cannot take 22 out of 21; wherefore try in your mind before you set down the answer, or figure of the quotient, whether it will go to the number of times, as is most easily suggested; as here the question or demand is readily answered 7 times; and so many times 3 may be taken in 21: but when you come to multiply the whole divisor by the times you place in the quotient, you begin at the right hand, and go towards the left, carrying the tens that arise to the next place, which increases the products so, that sometimes subtraction cannot be made, because the under line is greater than the upper; wherefore first try in your mind as above said; and since it will not bear 7 times, try if it will go 6 times; saying 6 times 2 is 12, 2 and carry 1, and 6 times 3 is 18, and 1 is 19; and 19 may be taken out of 21; therefore set down 6 in the quotient next

to

to the 4, and multiply the divisor 32 by it, and the work will  
 32) 78901 ) 24 (stand thus :

64..

149

128

210

102

181

Here the divisor 32 multiplied by 6 gives 192, to be taken out of 210, and the remainder is 18 to which after a point under it, I bring down the 1, the last figure of the dividend; and then there is 181 for a new dividend; then according to the rule I seek again, (for you are to note, that the aforesaid general

rule of working must be as often repeated

as you bring down a figure or cypher from the dividend, to make a new dividend; and also, that for every figure or cypher brought down, there must likewise be a single figure or cypher placed in the quotient,) how many times 32 the divisor may be taken out of 281 the dividend; or how many times 3 in 18, and the ready answer is 6 times: but on the trial I find it will not go 6 times: wherefore I try a quotient figure less by one, viz. 5 times,

32) 78901 (2465

64...

149

128

210

19:

181

160

(21)

Again, admit a nobleman hath 30,000l. per annum; what is his daily income?

If you divide 30,000 by 365, (the days in a year,) the quotient will be the answer. Set it down for working thus,

365) 30000 (8

First seek how many times 365 can be taken in 300? (an equal number of places with the divisor,) answer 0 times; wherefore I go a place farther to the right hand in the dividend, for 0 must never begin the quotient, as was said before and make a point under it, viz. under the last 0 but one, as may be seen in the example; and there being a place more in this dividend than in the divisor, I seek how oft the first figure of the divisor, viz. 3, is contained in the two first figures or places in the dividend, viz. 30, and the answer is 10 times; but

but you are never to take above 9 times at once in any of these examples of division: wherefore try in your mind, whether it will bear 9 times before you set it down in the quotient, (as was said before,) saying to yourself or in your mind, 9 times 5 is 45; 5 and go 4; 9 times 6 is 54, and 4 is 58, 8 and go 5; and 9 times 3 is 27 and 5 is 32; now 32 cannot be taken out of 30, wherefore take a figure less by an unit or one, viz. 8 times, and finding it will go 8 times, set down 8 in the quotient; and then say, 8 times 5 is 40, 0 and carry 4; and 8 times 6 is 48, and 4 is 52, 2 and carry 5; and 8 times 3 is 24, and 5 is 29: and then there is 2920 to be taken from 30000; and after subtraction, the work will appear thus;

$$\begin{array}{r} 365 \overline{) 30000} (8 \\ \underline{2920} \\ 80 \end{array}$$

Then to the remainder 80, I bring down 0, the last figure of the dividend, and then there is 800 for a new dividend; then you must try how oft you can take 365 out of the said dividend 800, and the number of places being equal in both divisor and dividend, viz. 3, ask how oft three in 8; answer twice; so put 2 in the quotient, and say twice 5 is 10; 0 and carry 1; and twice 6 is 12, and one is 13; 3 and carry 1; and twice 3 is 6, and 1 is 7; so there is 730 to be deducted from 800; and the remainder is 70, as in the work may be seen viz.

$$\begin{array}{r} 365 \overline{) 30000} (82 \\ \underline{2920} \\ 800 \\ \underline{730} \\ (70) \end{array}$$

will be a remainder of 305, which multiplied by 12, the pence in a shilling, produces 3660; which divided still by 365, gives 10 pence a day more; so that 30000l. a year is 8 l. 3s. 10d. a day.

Thus it appears that the nobleman hath eighty-two pounds per diem, and 70 pounds over, which if multiplied by 20, the shillings in a pound, would produce 1400 shillings; which if divided by the divisor 365, there would come out 3s. a day more, and there

Once



Once more, divide 46242 gallons by 252, the gallons in a tun, thus set down:

$$\begin{array}{r}
 252 \overline{) 46242} \quad (183 \\
 \underline{252} \\
 2104 \\
 \underline{2016} \\
 882 \\
 \underline{756} \\
 126
 \end{array}$$

In this example, after enquiry I find that it will not go twice, therefore I set down 1 in the quotient, and place 252 under 462 in the dividend, and after subtraction the remainder is 210; to which I bring down 4 from the dividend, and the dividend is 2104; and then seeking again, I find it will bear 8 times; which placed in the quo-

tient, and the divisor 252 multiplied by it, the product is 2016 to be subtracted from 2104; which being done, the remainder is 88, to which 2 the last figure of the dividend, being brought down, there is 882 for the last dividend: and then seeking again, I find it will go 3 times; and the product of the divisor multiplied by 3, 756, which subtracted from 882, there remains 126 for the remainder: so that by this division I find there are 183 tuns in 46242 gallons, and 126 gallons remaining, or over and above; which being half of 252 the divisor, the remainder is therefore half a tun more.

When you have a cypher or cyphers in the divisor, in the first, second or third place, &c. separate such cypher or cyphers with a dash of the pen from the rest of the divisor and also cut off as many figures or cyphers from the right of the dividend as you cut off cyphers from the divisor, and divide the remaining figures towards the left hand by the remaining significant figures of the divisor.

Example. Divide 42952 square poles of land by 160, the square poles in an acre of land.

$$\begin{array}{r}
 16 \mid 04295 \mid 3(268 \\
 \underline{32} \\
 109 \\
 \underline{96} \\
 135 \\
 \underline{128} \\
 (7)
 \end{array}$$

Here the cypher is cut off from the divisor and 2 from the dividend; then I ask how oft 16 in 42? answer twice; then the 16's in 109, answer 6 times, then the 16's in 135, answer 8 times. So there are 268 acres, and 7 remains, that is 268 acres, and  $\frac{7}{16}$  or  $\frac{72}{160}$  or almost half an acre.

Divide

Divide 27 | 62746 | 20(2323  $\frac{1}{2}$  or  $\frac{2}{3}$  20.

54...

87

81

64

54

106

81

(25)

When the divisor is 3, 4, 5, 6, or more figures, there is a sure and easy way of performing the work truly, by making a table of the divisor; which may be done by Addition; or by multiplying the divisor by 2, 3, 4, &c. Admit you are to divide 987654321, by 123456.

|                               |   |         |
|-------------------------------|---|---------|
|                               | 1 | 123456  |
|                               | 2 | 246912  |
| 123456) 987954321 (8000 times | 3 | 370368  |
| 987648.                       | 4 | 493824  |
| (6331                         | 5 | 617280  |
|                               | 6 | 740736  |
|                               | 7 | 864192  |
|                               | 8 | 987648  |
|                               | 9 | 1111104 |

The foregoing table is made by doubling the first line, which makes 246912; this added to the first or uppermost line gives the 3d line 370368; which also added to the said first line, makes 493824 for the 4th line of product; and so of the rest: still remembering to add the subsequent line or product to the first or uppermost line, till you come to the last line of 9 times, which is 1111104; the truth of which may be proved by multiplying the first or uppermost line by 2, 3, 4, 5, &c. and if you commit an error by addition, it may be found or corrected by multiplication.

*The Use of the said Table.*

When you have pointed out your number of places in the dividend, cast your eye on the table, and at the first view you may know how many times you can take, as in this example 7 times is too little, and 9 times too much; wherefore I set down 8 in the quotient, and place 987648 the tabular number which stands against 8 under the dividend, then I subtract that number from the dividend, and the remainder is 6; to which I bring down 3, and put 9 in the quotient; then to the 63 I bring down 2, and place 9 in the quotient; then to the 632 I bring down 1 the last figure of the dividend; but still it will not bear any times or time wherefore I put another 0 in the quotient, and so the work is done, and the quotient is 8000, and the remainder is 6321; as in the work.

Thus having plainly, fully, and pertinently shewn by verbal directions, the method of working Division; I think it unnecessary to give any more examples in that manner, but shall leave some few examples for practice sake, whose quotients and remainders are expressed, but the operation omitted, to save room, and for trial of the ingenuity of practitioners.

400690042 divided by 987, the quotient is 7498166 and the remainder 200.

79679002742 divided by 4689, the quot. is 102298784 and the remainder 4566.

969767002 divided by 976294, the quotient is 8163, and the remainder is 279080.

5678902345 divided by 9876543, the quotient is 46259, and the remainder 8775138.

64697 by 4500, quotes 169, and remainder 9127. And 9923240000 by 345000 quotes 23456, and remains (0)

*The Proof of Multiplication and Division.*

THESE two rules reciprocally prove each other: for in proving Multiplication, if you divide the product by the multiplier, the quotient will be like the multiplicand; and if by the multiplicand, the quotient will be the same with the multiplier.

I

Ex. I.

Ex. I.

$$\begin{array}{r} 345 \\ 24 \end{array}$$

Ex. II. Or thus.

$$\begin{array}{r} 1380 \\ 690 \\ \hline 24 \overline{) 8280} (345 \\ \underline{72 \phantom{00}} \\ 108 \\ \underline{96} \\ 120 \\ \underline{120} \\ (0) \end{array}$$

$$\begin{array}{r} 345 \overline{) 8280} (24 \\ \underline{690} \end{array}$$

$$\begin{array}{r} 1380 \\ 1380 \\ \hline (0) \end{array}$$

*To prove Division.*

Division may be proved by division thus.  
If you divide the dividend by the quotient, the quotient will be your former divisor.

*Example.*

Divide 8280 by 345.

$$345 \overline{) 8280} (24$$

Here the working again is needless, it being in the page foregoing; and shews the truth of the assertion, that division may be proved by division, as aforesaid.

But the most usual way of proving Division is by Multiplication in this manner, viz. Multiply the quotient by the divisor, and the product will be equal to the dividend. See the examples above.

345 Quot.

24 Divisor.

$$\begin{array}{r} 1380 \\ 690 \\ \hline \end{array}$$

*Note,* That when there is any remainder, such remainder must be taken in, or added to the product.

*8280 Proof.*

As in multiplication I gave some examples of its utility in money, so likewise I shall give a few examples in division of money, whereby may be seen how expeditiously some things may be done without having recourse to Reduction, the Rule of Three, &c. viz.

*Example*



Example.

Divide 26l. 12s. 6d. equally among five men. For disposition of working, set it down as follows:

l. s. d.

5) 26 12 6

5 6 6

In the working of this, I say the 5's in 26, 5 times; 5 times 5 is 25, from 26, and there remains 1, that is 1 pound, or 20 shillings; which with the 12s. in the place of shillings, makes 32s; then the 5's in 32, 6 times; 6 times 5 is 30 from 32, and there remains 2s. or 24d.

Proof 26 16 6

which with 6d. in the place of pence, makes 30, then the 5's in 30, 6 times; and so the work is done; and the answer is that each man must have 1. 5 6 6 for his equal share in the said division of 1. 26 12 6 amongst five persons; and the truth of it is proved by multiplication of money, sufficiently shewn in the rule of Multiplication; as here 5 times 6 is 30, and carry 2; and 5 times 6 is 30, and 2 is 32, 12 and carry 3; and 5 times 5 is 25, and, 1 is 26. &c.

Example.

Divide the charges of a country feast, amounting to 246l. 12s. 4d. equally amongst 12 stewards, to know what each steward must pay.

l. s. d.

2) 246 12 4

Here I say the 12's in 24 twice, and 12's in 6, 0 times, and there remains 6l. or 120s, and 12s. makes 132; and the 12's in 132, is 11, and there remains 1s. or 12d, then 12 and 4 is 16, and the 12's in 16 once, and 4 remains; so that each steward must pay 1, 20 11 4, or four twelfths of a penny, something more then a farthing; and this may be proved as that above.

When any quantity is such a number that any two digits of the multiplication table multiplied together make the said quantity or number, then the quotient may be very expeditiously found at two divisions, and sooner than one. Example. Divide 7872 by 32. In this example the component parts, which multiplied together make the said divisor 32, are 4 and 8 or 8 and 4; for it matters not which of them you divide by first; for either way will give a true and the

I 2

same

same quotient; as may be seen by the different methods of the following work.

$$\begin{array}{r} 4) 7872 \\ \hline \end{array}$$

$$\text{Or thus, } 8) 7872$$

$$\begin{array}{r} 8) 1968 \\ \hline \end{array}$$

$$\begin{array}{r} 4) 984 \\ \hline \end{array}$$

246 Quotient.

246 Quot.

Here though the operations are divers, yet the quotients are one and the same. Again divide 44184 by 56.

Example 2.

$$\begin{array}{r} 7) 44184 \\ \hline \end{array}$$

$$\begin{array}{r} 8) 6312 \\ \hline \end{array}$$

789 Quot.

Here the divisor are 7 and 8, or 8 and 7; for either of both will give the same quotient.

And thus may the above forty examples be wrought by numbers out of the multiplication table, with great dispatch and expedition, as by 15, 18, 25, 35, 64, 72, 96, &c.

When it happens that there is any remainder in the first division, or the last, or both; to know the true remainder, if you divided by the common way, take this method, viz. Multiply the first divisor by the last remainder, and take in or add the first remainder, if there be any, and the product will be the true or same remainder, as if you divided by the long way.

Example. Divide 4567 by 15.

$$\begin{array}{r} 3) 4567 \\ \hline \end{array}$$

$$\begin{array}{r} 5) 1522 \quad 1 \\ 304 \quad 2 \\ \hline \end{array}$$

(7)

The same method may be taken with respect to component parts in division of money, as in division of simple numbers.

Example

Example.

3) l. s. d.  
Divide 463 18 06 into 28 equal parts.

6) 154 12 10

Ans. 25 15 05  $\frac{4}{8}$

By this method of division of money, (if the quantity be as aforesaid, made by even component parts,) you may by having the price of several things, know the price or value of one thing at the said rate, as well as by the rule of Three; so doth multiplication of money answer questions in the Rule of Three, when the first number is as unit or one.

Example by Division.

7) l. s. d.  
If 84 lb. of coffee cost 31 10 0 what costs 1 lb.

12) 4 10 0

Ans. 0 07 6

As in multiplication of money, to have an answer, you multiply the price by the quantity; so in division of money you divide the price by the quantity, to have your answer.

I could speak more largely, if I had room, of the excellent uses that may be made of Multiplication and division only but their various uses will be better understood by their applications in the following rules of arithmetic, particularly in the next rule, called,

REDUCTION.

**W**HICH is an application to Multiplication and Division, shewing how to reduce numbers of one denomination to another, thereby discovering the same value, though in different terms.

1. As first, All great names are brought into smaller by Multiplication, as pounds into shillings, pence, or farthings, by multiplying by 20, 12, and 4. Or hundreds weight, into pounds weight, by multiplying by 4, and by 28, or by 112; or lower into ounces or drams, by multiplying by 16 and 16.

2. And on the contrary, All small names are brought into greater by Division; as farthings into pounds, by dividing by 4, 12, and 20; and pounds weight into hundreds weight, by

1 2

dividing

dividing by 28 and 4; the drams into pounds, by dividing by 16 and 16.

But you may note, That pounds are brought into pence by multiplying by 240; or into farthings, by multiplying by 960; and just the contrary by Division.

The sense, meaning and use of Reduction is expressed in the following verses.

*Reduction* shews how we of names in use,  
May great to small, and small to great reduce;  
So that the answer which shall thence arise  
The given sum in value equalize:  
Multiply or divide it back you must,  
Which makes again your given number just.

Example. 1.

In 240l. sterling, how many pence?

20 shillings = 1 pound;

Or thus:

4800 shillings in 240l.

240l.

12 pence = 1 shilling.

240d. in 1l,

57600 pence in 240l.

9600

480

Ans. 57600

Example 2.

In 226 tons of copper, how many pounds weight?

20 C. = 1 ton.

4520 hund. wt. in 226 tons.

4 quarters = 1 C.

Or thus

226 tons

20

18080 qrs. of a Cwt. 226 tons.

28 lb. = 1 qr. of a C.

4520

112

144640

36160

54240

4520

506240 pounds wt. in 226 tons

506240 lbs.

These foregoing examples are great names to be brought into small, (as may easily be observed and understood); therefore, as the first rule directeth, it is done by Multiplication, by multiplying the greater name by the number of the next lesser name, that makes one of the said greater; as in the last example, the lesser name to pounds is shillings wherefore



wherefore I multiply by 20, because 20 of that lesser name makes one of the said greater name, i. e. 20 shillings make a pound. And the same regard is had, and method observed in the example of weight; as is very plain to be seen in the work, and is called Reduction descending, because it brings higher or greater denominations into lower or lesser.

**Example 3.**

4)

Bring 494400 farthings into pounds.

12 123600 pence.

2 | 0 1030 | 0 shillings.

515 pounds.

Or thus.

96 | 0 49440 | 0 (515).

480

— In this way I

144 divide by 960

96 the farthings

— in a pound

480 &c.

480

(0)

In the first way I divide the farthings by 4, because 4 of them make a penny, and the quotient is pence; then these pence I divide by 12, because 12 of them make a shilling, and that quotient is shillings; which shillings I divide by 20, to bring them into pounds, thus: I cut off the cypher in the dividend towards the right, for the cypher that is in the divisor 20, which is also separated from 2 with a dash of the pen, (as may be seen in the work); then I halve the figures one by one, as they are united with the remainder in the dividend: which half is pounds, and is a short way of dividing by 20. In the example I say, the half of 10, (because I must not set down 0 at the beginning) is 5, and the half of 3 is 1, and there remains 1; which makes the next which is 0, 10; and the half of 10 is 5, so that 10300 shillings make 515 pounds, or there are so many pounds in 204400 farthings.

Note, in dividing by 20 as above if any thing remains, it must be joined or annexed to the figure or cypher cut off; as suppose there had in halving the last figure (excepting what you cut off) remained 1; then that one must have been joined to the cypher separated or cut off, and there would have been ten shillings.

**Example**

## Example 4.

Reduce 27552 pounds weight into hundreds weight.

$$\begin{array}{r}
 28 \overline{) 27552} \quad (984 \\
 \underline{252} \phantom{00} \\
 235 \phantom{00} \\
 \underline{224} \phantom{00} \\
 112 \phantom{00} \\
 \underline{112} \phantom{00} \\
 (0)
 \end{array}
 \quad 246 \text{ Cwt. Ans,}$$

Or thus :

$$\begin{array}{r}
 112 \overline{) 27552} \quad (246 \text{ Ans,} \\
 \underline{224} \phantom{00} \\
 515 \phantom{00} \\
 \underline{448} \phantom{00} \\
 672 \phantom{00} \\
 \underline{672} \phantom{00} \\
 (0)
 \end{array}$$

In the first of the two foregoing examples, I divide the pounds by 28, to bring them into quarters : then I divide those quarters by 4, to bring them into hundreds weight, as in the work.

In the second way, I divide the pounds weight by 112, the pounds in a hundred weight, and it brings the pounds weight into hundreds weight at once,

The said examples are small denominations to be brought into greater, and therefore, according to the second rule of direction, it is done by division, by dividing the lesser name by as many of them as make the next greater name ; that is by 28, because 28 of them make one of the next greater name viz, a quarter of a hundred, and this reduction is called *Reduction ascending*, because it brings low or small names to higher or greater denominations ; by which may be observed, That all questions in reduction, whether ascending or descending, are answered either by Multiplication, or division, or by both ; as will plainly appear in the sundry examples of reducing of divers denominations to others.

When it is required to reduce numbers of several denominations by Reduction ascending, or by Multiplication, you are to work as before ; but you must always remember to take in such numbers as stand in the place of the next inferior denominations, as when you multiply the pounds by twenty, if there be any shillings in the denomination or place of shillings, you must take them in ; so likewise when you multiply the shillings by twelve, if there be any pence in the place of pence, you must also take them in ; and so when you multiply

multiply the pence by 4, to bring them into farthings, you must take in the farthings if there be any, in the place of farthings, as in the following work.

Example 5.

l. s. d.  
In 346 16 9½ how many farthings?  
20 shillings one pound.

6936 shillings in 346l. 16s.  
12 pence one shilling.

83241 pence in 346l. 10s. 9d.  
4 farthings one penny.

332966 farthings in 346l. 16s. 9½d.

The example is so plain in the work, that it hardly need any explanation; but I begin to say 0 is 0, but 6 in the units of shillings is 6; then twice 6 is 12, and 1 in the tens of shillings is 13, 3 and carry 1; and twice 4 is 8, and 1 is 9 and twice 3 is six; then by 12, saying 12 times 6 is 72, and 9d. in the place of pence, is 81, 1 and carry 8; and 12 times 3 is 36, and 8 is 44, 4 and carry 4; and 12 times 9 is 108 and 4 is 112, 2 and carry 11; and 12 times 6 is 72; and 11 is 83, &c.

Example 6.

C. qrs. lb.  
In 56 2 16 of tobacco how many pounds?  
4 qrs. one C.

226 qrs. in 56 C. 2 qrs.  
28 lb. one qr. of a C.

1814  
453

Answer 6344 pounds wt. in 56 C. 2 qrs. 16 lb.

In the foregoing work, I must multiply the 56 C. by 4 and take in 2 quarters, and then I multiply the 226 qrs. by 8, saying 8 times 6 is 48, and 6 the unit figure in the odd pounds, is 54; 4 and carry 5, &c. Then I multiply by 2, saying twice 6 is 12, and 1 that stands in the place of ten in the odd pounds is 13, 3 and carry 1, &c. Then adding the

the two products together, they make 6344 pounds, contained in 56 C. 2 qrs. 16 lb. as in the work is conspicuous. Or, the example may be sooner done, by multiplying the 56 C. by 112, the pounds in a Cwt. and taking in the odd wt. viz. 2 qrs. 16 lb. or 72 pounds at once.

$$\begin{array}{r} \text{C.} \\ 56 \\ 112 \\ \hline \end{array}$$

672

56,72 odd wt. see the work.

6344

Or still briefer thus, by setting down the 56 C. four several times in the following manner, taking in the odd weight as before.

$$\begin{array}{r} 56 \text{ C.} \\ 56 \\ 56 \\ 56 \\ \hline 56,72 \end{array}$$

The same as above, viz. 6344 pounds.

### *Reduction Ascending.*

Is the bringing numbers from a lesser denomination to a greater, and is the reverse of *Reduction Descending*; and each may serve as a proof to the other, one being performed by Multiplication, and the other by Division.

And note, That when at any time, in *Reduction Descending* you take, or add to, the odd money, weight or measure, as you multiply the several denominations, such quantities will be the remainders in *Reduction Ascending*.

### *Examples by the two following sums.*

4)

In 332966 farthings, how many pounds?

$$\begin{array}{r} 12) \quad 83 \quad 41 \quad \frac{1}{2} \text{ remains, what taken in?} \\ \hline \end{array}$$

$$\begin{array}{r} 20) \quad 693 \quad , \quad 6 \text{ 6d. remains, what taken in?} \\ \hline \end{array}$$

$$\begin{array}{r} 346 \quad 16\text{s. remains, what taken in?} \\ \hline \end{array}$$

So in that 332966 farthings there are 346l. 16s. 9 $\frac{1}{2}$ d. and is a sure proof of the foregoing work descending.

Again,



Again, in 6344 pounds wt. how many hundreds wt?

$$\begin{array}{r} 28) 6344 \text{ (226 qrs.} \\ \underline{56} \end{array}$$

$$\begin{array}{r} 74 \\ \underline{56} \\ 184 \\ \underline{168} \end{array}$$

(16 remains pounds taken in:

So that in 6344 pounds wt. there is 56 C. 2 qrs. 16 lb. and proves the foregoing examples descending to be right.

Now follow promiscuous examples of both kinds of Reduction, one proving the other.

In 276l. 12s. how many pence?

$$\begin{array}{r} 20 \\ \underline{12} \\ 5532 \end{array} \quad \begin{array}{r} 12 \\ \underline{12} \\ 2 \mid 0) 553 \mid 2 \end{array}$$

Ans. 66384 Ans. 276 | 12 and proof.

In 47964 grains, how many pounds Troy?

$$\begin{array}{r} 20 \\ 24) 47964 \text{ (199 | 8} \\ \underline{24} \dots 12) 99 \text{ (18 pwt.} \end{array}$$

$$\begin{array}{r} 239 \\ \underline{216} \end{array}$$

$$\begin{array}{r} 236 \\ \underline{216} \end{array}$$

$$\begin{array}{r} 204 \\ \underline{192} \end{array}$$

In 8lb. 3 oz. 18 pwt. 12 grs. how many (grains?

$$\begin{array}{r} 12 \\ \underline{12} \end{array}$$

$$\begin{array}{r} 99 \\ \underline{20} \end{array}$$

$$\begin{array}{r} 1998 \\ \underline{24} \end{array}$$

O. (12)

$$\begin{array}{r} 7994 \\ \underline{3997} \end{array}$$

Answer 47964 and Proof.

In

In 34 C. 3 qrs. of cotton wool, how many pounds?

34 112) 3892 (34 C.  $\frac{1}{4}$  Proof.

34 336

34 | 84

3892 lbs.

532

448

(84) lb. or  $\frac{1}{4}$  of a C.

In 456 C. 3 qrs. 27 lb. of copper, how many pounds? and what comes it to at 21d. per pound?

456 C.

456

456

456

111

51183 pounds.

21d. per lb.

51183

102366

Or thus,

C.

456

112

5472

456

111

51183

1074843 Pence, which bring into pounds by Division, or Reduction Ascending, as before shewn, and will amount to l. 4478: 10: 3.

Bring 4796 ells Flemish into ells English; multiply by 3 3 and divide by 5, because 3 qrs. make 1 ell Flemish, and 5 an ell English.

5) 14388

2877 3-5ths.

Reduce 456 ells English into yards: multiply by 5 and divide by 4, thus:

456 English ells.

5 qrs. 1 English ell.

In 570 yds. how many E. ells?

4) 2280 qrs.

4 qrs. 1 yd.

yds. 570 Ans.

5) 2280

English ells 456 Answer and Proof.

Bring

bring 130 Tuns of wine into gallons.  
4 hogsheads one tun.

520  
63 gallons 1 hogshead.

Or thus:  
252 gallons one tun:  
130 tuns.

1560  
3120

7560  
252

32760 gallons. Ans.

32760

|                 | <i>Lasts.</i> | <i>Quarters.</i> | <i>Bushels.</i> | <i>Pecks.</i> |
|-----------------|---------------|------------------|-----------------|---------------|
| Reduce 42       | 3             |                  | 5               | 2 into Pecks  |
| 10 qrs. 1 last. |               |                  |                 |               |

473  
8 bush. 1 qr.

Here I multiply by ten, and  
take in 3 qrs. and then by 8, and  
take in 5 bushels, and lastly, by  
4, and take in two pecks.

3389  
4 pecks one bushel.

13558 pecks in forty-two lasts, 3 qrs. 5 bushels and two  
pecks.

4) In 13558 pecks, how many lasts, &c.

8) 3389 two pecks taken in.

1 | 0) 42 | 3 — 5 bushels taken in.  
lasts 2 — 3 quarters taken in.

Ans. 42 lasts, 3 qrs. 5 bushels, and 2 pecks.

By REDUCTION also,

Foreign coins or exchanges may be reduced to Sterling  
money; and on the contrary, Sterling money to Foreign.

## Examples.

Reduce 246 Venetian Ducats de Banco into Sterling money, the exchange at 52d. Sterling per ducat, thus;

$$\begin{array}{r}
 246 \\
 52 \\
 \hline
 492 \\
 1230 \\
 \hline
 12) 12792 \\
 \hline
 2 \mid 0) 106 \mid 6
 \end{array}$$

53l. 6s. To be paid in London for the 246 ducats drawn in Venice.

Reduce 53l. 6s. Sterl. into ducats at 25d. Sterl. per ducat.

$$\begin{array}{r}
 20 \\
 \hline
 1066 \\
 12
 \end{array}$$

52) 12792 (246 Ducats to be paid in Venice for 53l. 6s. drawn in London.

104

23. &c.

To reduce Flemish money into Sterling money, divide the pence Flemish by the course of exchange; suppose 33s. 4d. and the quotient will be the Sterling money; and what remains multiply by 20, &c.

## Example.

In 242l. 13s. 4d. Flemish how many pounds Sterling, &c.

$$\begin{array}{r}
 33s. 4d. \text{ Flemish.} \quad 4853 \\
 12 \quad \quad \quad \quad \quad 12 \\
 \hline
 400 \quad 4 \mid 00) 582 \mid 40(145 \\
 \hline
 \text{Remains } 240 \\
 20 \\
 4 \mid 00) 48 \mid 00(12
 \end{array}$$

Answer 145l. 12s.

By the work it appears, that 145l. 12s. Sterling answer



is equivalent to 242l. 13s. 4d. Flemish, at 33s. 4d. Flemish per pound Sterling.

Thus Flemish money may be reduced to Sterling money, though the course of exchange may be at any rate of shillings and pence Flemish; but when at the rate above, viz. 33s 4d. then the answer is sooner found by multiplying by 3, and dividing by 5; for 400d. Flemish is the same to 240d. Sterling (each being a pound) as 5 is to 3, for if you divide 400 by 5 it quotes 80: so 240, dividing by 3, quotes the same.

The foregoing Example done by the last proposed way.

l. 242 13 4 Flemish

3

5)728 60 0

l. 145 12 0

Note. French money is reduced to Sterling, viz. Livres, Sols Deniers, (or French pence) as Sterling or Flemish money by multiplying by 20 and 12.

In 426 French crowns, each 64d.  $\frac{1}{4}$  Sterling, how many pounds Sterling?

426

54

1704

2130

106  $\frac{1}{2}$  d.

12)23110 10d.  $\frac{1}{2}$

2 | 0) 193 | 5 rod.  $\frac{1}{2}$

Ans. 96 5 10d.  $\frac{1}{2}$

Again, bring 1600 pieces of Eight, at 54d. 1 farthing Sterling into pounds Sterling.

K 2

1600

$$\begin{array}{r}
 1600 \\
 54 \\
 \hline
 6400 \\
 8000 \\
 400 \\
 \hline
 12) 86800 \text{ pence}
 \end{array}$$

$$2 \mid 0) 723 : 3 : 4$$

$$1. \quad 361 : 13 : 4$$

This method is of use in reducing the Exchanges of Cadiz, Leghorn, and Genoa. Or when the Exchange is at so many pence and eights of a penny; (as often the exchanges run) then multiply the given number to reduce it into pence by the pence contained in a piece of Eight, and also multiply the said given numbers apart, by the numerator or upper figure of the fraction, and divide by the denominator or under figure of the fraction, and the quotient will be pence; which add to the other pence produced by multiplying the given number by the pence, contained in one of the pieces or exchange, then divide the total pence by 12, &c.

Example.

Bring 296 dollars at 52d.  $\frac{1}{4}$  Sterling into pounds Sterling.

$$\begin{array}{r}
 296 \\
 52 \\
 \hline
 1400 \\
 15392 \\
 185 \\
 \hline
 12) 15577
 \end{array}$$

$$2 \mid 0) 129 \mid 8 \text{ 1d.}$$

296 dollars.

$$\begin{array}{r}
 5 \\
 \hline
 8) 1480 \\
 185
 \end{array}$$

Answer l. 64 : 18 : 1 Sterling money due for 296 dollars at 52d.  $\frac{1}{4}$  Sterling per dollar.

But Ducats Dollars, Crowns, Milreas, &c are more expeditiously cast up by the rules of Practice hereafter to be shewn. And so much for Reduction. The next rule is Arithmetic is

*The GOLDEN RULE, or RULE OF THREE.*

**I**T is called the Golden Rule, from its excellent performance in Arithmetic, and in other parts of mathematical learning.

And it is called the Rule of Three, because from three numbers given, proposed or known, we find out a fourth number required or unknown which bears such proportion to the third, as the second doth to the first number: from whence also it is called the Rule of Proportion.

And of this proportion there are two sorts; one called Direct, and the other Indirect or Reverse.

Direct proportion is when the second and third numbers are to be multiplied together, and their product divided by the first.

Indirect, or Reverse Proportion, is when the first and second numbers are to be multiplied together, and their product divided by the third.

In Direct proportion, the fourth number, or answer to the question, contains the third number as often (or as many times) as the second contains the first.

But in Indirect Proportion, the greater the third number is, the less is the fourth; and the lesser the third number is, the greater is the fourth.

*The stating the question.*

The chief difficulty that occurs in the Rule of Three is the right placing the numbers, or stating the question; for when that is done you have nothing more to do but to multiply and divide, and the work is done.

And to this end, we are to remember that of the three given numbers, two of them are always of one name or denomination, and the other number is ever of the same name with the fourth number or answer required; and must always be the second or middle number: And the number that is the Question must still possess the third or last place, and the other number of the same name with the third, must be the first number; for the first and third number must always be of one name. viz. both money, both weight, both time, or both measure. And though they be of one kind, yet if one of them is altered by Reduction, from a high to a lower name, then the other must be reduced to the same name, For you must particularly note, That if either the first or third numbers consist of several denominations, that is, of pounds and shillings; or pounds, shillings, and pence; or of pounds, shillings

shillings pence and farthings ; or of tons, hundreds, quarters, and pounds, &c. then must they be reduced to the lowest name mentioned. And if one happen to be of divers denominations, and the other but of one name ; then the number of one name must be reduced as low, or into the same name with the other ; As suppose the first number is brought into farthings, then the third number though but pounds must be brought into farthings also. Then multiply the 2 and 3 terms together, (when the proportion is direct) and divide the product by the first number, and the quotient thence arising will be the answer to the question, and in the same name with the middle number : And if in a small denomination it must be brought by division to the highest name, for the better understanding the answer. You must also note, That if the middle number be of several denominations, it must be brought into the lowest mentioned,

**Example. I.**

If 12 gallons of Brandy cost 4l. 10s. what will 134 gallons. cost at that rate ?

| Gallons. | l. | s. | Gallons.  |
|----------|----|----|-----------|
| If 12    | 4  | 10 | 134       |
|          | 20 |    | 90        |
|          | 90 |    | 12) 1:060 |

2 | 0) 100 | 5    Ans. 50l. 5s.

Here the first and third numbers are like names, viz. both Gallons ; and 134 being the number that asked the question, it hath the third place as it always must, as before asserted ; and 4l. 10s. the second number, being of two denominations viz. pounds and shillings, it is reduced into the lowest mentioned, viz. shillings as before directed, and then the three numbers are these, viz. 12 90 134, and 134 the third number being multiplied by 90, the second number produces 12060, which divided by 12, the first number, quotes 1005, which are shillings because 90 the middle number, were shillings, and 1005 shillings, divided by 20, gives 50l. 5s. for the Answer ; and for the proof of its truth, state it back again thus :

Example



Example II.

|                |    |        |      |
|----------------|----|--------|------|
| Gal.           | l. | s.     | Gal. |
| If 134 cost 50 |    | 5 what | 12?  |
|                | 20 |        |      |

---

1005  
12

---

134) 12060 (90s.  
1206

---

Ans. or 4l. 10s. the cost of 12 gallons, and is a sure proof of the first work: and the back-stating and working the

proof is as much a question in the Rule of Three as the first.

By the foregoing rules and directions, and these two operations, you may understand the nature of the rule and method of working: and with ease and certainty, answer any example proposed in the Rule of Three direct, and therefore I shall omit what I can of verbal directions, and abate as much of figure-work as is consistent with dispatch, and not leaving the work too obscure, to save room, and not to be too prolix: and to this end, I shall only give the examples stated and a little of the work, and the answer to the questions, leaving most of the operations to be performed by the ingenious practitioners.

Example III. If 56 lb. of Indigo cost 11l. 4s. what will 1008 lb. cost at that rate?

lb. s. lb.

If 56—224—1008? Answer 4032s. or 201l. 12s.

Example IV. If half a Cwt. of Copper cost 4l. 8s. what quantity will 14s. buy at that rate?

s. lb. s.

If 98 be 56 what 14? Ans. 8lb.

Example V. If 4 C.  $\frac{1}{2}$  Sugar cost 5l. 15s. 7d. what will four hogsheds come to, weighing 42 C. 1 qr. 14lb?

lb. d. lb.

If 532—1387—4746 Ans. 12373 pence, or 51l. 11s. 1d. And the remainder, 266. multiplied by four, gives 1064; which also divided by the first number 552, gives a halfpenny more; so the whole is 51l. 11s. 1d.

Any of these examples, or any other, may be proved by a back stating according as the first example was proved; and each proof becomes another question in the Rule of Three, as was said before.

Example

Example VI. If I have 56l. a year salary, how much is due to me for 144 days service at that rate?

days. l. days.

If 365 50 144? Answer l. 19 14 6  $\frac{20}{100}$  parts of a penny.

In this example the product of the third by the second number is 7200; which divided by the first 365 (according to the rule) quotes 19 pounds the name of the middle number, and there is a remainder of 265; which multiplied by 20, according to Reduction, and the product still divided by 365, there comes out 14s. and yet there is a remainder of 190, which multiplied by 12, and the product divided by 365, gives 6d. and there is a remainder of 90; which, if multiplied by 4, (the last inferior name) and divided by 365, yet would not come to a farthing more; so that the answer is as above l. 19 14 6  $\frac{20}{100}$ .

You are to note always, That when any thing remains that is reducible to an inferior or lower name, after multiplied as above, it must continually be divided by the first number.

Note also, When the first of the three given numbers is an unit or one, the work is performed, or answer found, by multiplication.

Example VII. If I am to give 17s for 1 lb. of Belladine Silk, what must I give for 264 lb. at that rate.

lb. s. lb.

If 1 ——— 17 ——— 264

17

Answer 4488s. or 224l 8s.

Example VIII. If I buy 49 bags of Hops at 12l. 12s. 6d. per bag, what come they to at that rate?

Bag l. s. d. Bags.

1 ——— 12 12 6 ——— 49

7 and by 7

88 07 6

7

618 12 6

The foregoing work is performed by the component parts as taught in multiplication.

When the third or last of the three given numbers is an unit or one, then the work is performed by Division.

Example

Example IX. If 12 Ells of Holland cost 3l. 6s. what is the price of 1 Ell at that rate?

Ells                      12)s.                      Ell.  
If 12 ——— 66 ——— 1 Answer 5s. 6d.

5  $\frac{6}{12}$  or 5s. and 6d.

Example X. If 56 Yards of Broad Cloth cost 40l. 12s. what comes a Yard to at that rate?

Yds.                      7)l.                      s.                      Yd.  
If 56 — 40 — 12 — 1 Ans. 14s. 6d. per Yard.

8) 5 — 16

0 — 14 — 6 Answer.

This example is wrought by Division of money, and by component parts, as before taught in the Rule of Division.

Example XI. If A owes B 296l. 17s. and compounds at 7s. 6d. in the pound: what must B take for his debt?

s.                      d.                      s.  
If 20 ——— 90 ——— 5937. Answer £ 111 — 6 — 4  $\frac{1}{2}$

Example. If a gentleman hath an estate of 500l. a year, what may he expend daily, and yet lay up 12l. 15s. per Month?

First multiply 12l. 15s. per 12, the months in a year, and it makes 153l. which deducted from 500l. the remainder is 347. Then say,

Days.                      l.

If 365 ——— 347, what 1 Day? Ans. 19s. 9s.

After you have reduced the pounds into shillings, which make 6940, you divide them by 365, and the quotient is 19s. per day.

*The Rule of Three Reverse, or of Indirect proportion.*

**W**HAT Indirect Proportion is, has been hinted already. In Direct Proportion, the product of the first and fourth numbers is equal to the product of the second and third.

But in this Proportion, the product of the third and fourth numbers is equal to the product of the first and second.

The method of stating any question in this rule is the same with that of the Direct Rule.

For the first and third numbers must be of one name, or so reduced, as in that rule; and the number that moves the question

stion must possess the third place : and the middle number will be of the same name with the answer, as it is there. *To know when the Question belongs to the Direct, and when to the Reverse Rule.*

When the question is stated as above said, consider whether the answer to the question ought to be more or less than the second number ; if more, than the lesser of the first and third numbers must be your Divisor.

But if less, then the greater of the two extreme numbers must be your Divisor.

And if the first number of the three is your Divisor, then the Proportion is Direct ; but if the last of the three is your Divisor, the Proportion is Indirect or Reverse.

Or without regard either to Direct or Reverse :

If more is required, the lesser } is the Divisor.

If less, the greater }

*Example for Explanation.*

Example 1. If 4 men plane 250 deal boards in 6 days how many men will plane them in 2 days?

If 6 days require 4 men, what 2 days? Ans. 12 men,

---

2) 24

12 Answer.

Example 2. If a Board be 9 inches broad, how much in length will make a square foot.

In Br.

In L

If 12 ————— 12 what 9 inches broad?

12

---

9) 144

Answer 16 inches in length.

In these examples, the first and second numbers are multiplied together and their product is divided by the third ; for in the first example it is most certain that 2 days will require more hands to perform the work than 6 days ; therefore the lesser of the extreme numbers is the divisor : and declares the question is in the Indirect Proportion.

Likewise in the second Example, 9 inches in breadth must needs require more in length to make a foot than 12 inches in breadth ; wherefore it is in the same proportion with the first example, because the Divisor is the third number.

Example



**Example 3.** How many yards of Sarcenet, of 3 qrs wide, will line 9 yards of Cloth, of 8 qrs. wide?

qrs. wide                      yds. long.                      qrs. wide.

If 8 ————— 9 what ——— 3

8

Here the narrower the silk the more in length is required.

3)72

**Yards 24 Answer.**

**Example 4.** If a Quartern Loaf weigh 4  $\frac{1}{2}$  lb. when wheat is 5s. 6d. the bushel; what must it weigh when wheat is 4s. the bushel?

d.                      Half lb.                      d.                      lb.

If 66 ————— 9 ————— 48 Answer 6  $\frac{1}{10}$

**Example 5.** If in 12 months 100l. Principal gain 5 pounds Interest; what Principal will gain the same Interest in 5 months;

M.                      l. P.                      M.

12 ————— 100 ————— 5

12

5)1200

**Answer, 240l. Principal.**

*The Double Rule of Three Direct.*

**I**N this Rule there are five numbers given to find out a sixth, which is to be in proportion to the product of the fourth and fifth numbers, as the third number is to the product of the first and second numbers.

Questions in this kind of Proportion are wrought either by two operations in the Single Rule of three Direct, or by the rule composed of the five given numbers, and the one may be a proof to the other; as may be seen in the example following.

**Example 1.** If 100 pounds Principal in 12 months gain 5 pounds interest; what will 246 pounds Principal gain in 7 months?

If 100 gain 5 what 246

5

1 | 00) 12 | 30

20

1 | 00) 6 | 00 Answer 12l, 6s

M

M.                      l. s                      M.

Then say again, If 12 gain 12 6 what 7

20

246

7

12) 1722

240) 14316

l. 7 : 3 : 6

In the first stating, the answer is, that if 100l. gain 5 pounds, then 246l. will gain 12 pounds 6 shillings.

Then I say in the next stating; If 12 months gain 12l. 6s. what will 7 months gain? and the answer is, l. 7—3—6. And so how much will 246 pounds gain in 7 months, if 100 pounds gain 5 pounds in 12 months.

You must particularly note, That in all operations the answer to the question is found by two statings of the Rule of Three, the answer of the first stating is ever the middle number of the second stating; as in the preceding example.

The foregoing question may be answered by a stating composed of the five given numbers, thus:

| (1)    | (2) | (3) | (4)  | (5) |
|--------|-----|-----|------|-----|
| l.     | M.  | l.  | l.   | M.  |
| If 100 | 12  | 5   | 246  | 7   |
| 12     |     |     | 7    |     |
| 1200   |     |     | 1722 |     |
|        |     |     | 5    |     |

1200) 8610(7l.

8400

210

20

1200) 4200(3s.

3600

600

12

In this work, the stating the question, the first and fourth numbers are made of one name, and the second and fifth; then the two first numbers are multiplied together for a divisor, and the last three numbers are multiplied together for a dividend, and the quotient or answer is of the same name with the middle number viz. pounds interest. In the work I find the first quotient 7

pounds

ounds interest; and so I proceed 1200) 7200( 6d.  
 from one denomination to another,  
 till I find the same answer as in the  
 work at 2 statings, viz. 1 7—3—6.

7200

(0)

This method of operation serves to answer all questions in the Double Rule of Three Direct.

*The Double Rule of Three Reverse.*

IN this Rule you must place your numbers in such order that your second and fourth numbers may be of one name, or denomination, and your third and fifth.

Example: If 100l Principal in 12 months gain 6l. interest; what Principal will gain 20l. interest in 8 months?

Stated thus:

|        |     |         |     |         |
|--------|-----|---------|-----|---------|
| 1. P   | Mo. | 1. Int. | Mo. | 1. Int. |
| (1)    | (2) | (3)     | (4) | (5)     |
| If 100 | 12  | 6       | 8   | 20      |
| 12     |     |         | 6   |         |

1200

20

48 the divisor.

48) 24000 (500l. Principal Answer.

240

(0)

In this work, the third and fourth numbers are multiplied together for a divisor; and then the first is multiplied by the second, and that product by the fifth number, and the product 24000 is divided by 48, and the quotient is 500l. principal; which is the answer to the question, as may be seen in the Work.

*Rules of Practice.*

THESE rules are so called from their frequent use. Brevity in casting up most sorts of goods or merchandize.

Note. That any question in the Rule of Three, when the first number in the stating is 1. is more briefly done by these rules called Practice.

But previous to these rules it is necessary to have the following tables by heart.

| Parts of a Shilling.            | Of a Pound.      | Parts of a pound      |
|---------------------------------|------------------|-----------------------|
| d.                              |                  | s. d.                 |
| 6 is $\frac{1}{2}$ —            | — $\frac{1}{20}$ | 10 0 is $\frac{1}{2}$ |
| 4 is $\frac{1}{3}$ —            | — $\frac{1}{30}$ | 6 8 is $\frac{1}{3}$  |
| 3 is $\frac{1}{4}$ —            | — $\frac{1}{40}$ | 5 0 is $\frac{1}{4}$  |
| 2 is $\frac{1}{5}$ —            | — $\frac{1}{50}$ | 4 0 is $\frac{1}{5}$  |
| $1\frac{1}{2}$ is $\frac{1}{6}$ |                  | 3 4 is $\frac{1}{6}$  |
| 1 is $\frac{1}{7}$              |                  | 2 6 is $\frac{1}{7}$  |
|                                 |                  | 2 0 is $\frac{1}{8}$  |
|                                 |                  | 1 8 is $\frac{1}{9}$  |
|                                 |                  | 1 0 is $\frac{1}{10}$ |

Parts of a Shilling.  
6d. is  $\frac{1}{2}$  |  
of 1s. |

Example I.

426 lb. of Sugar at 6d. per lb.

$$\begin{array}{r} 2 \overline{) 021} \mid 3 \end{array}$$

l. 10—13 Answer.

Here 6d. being the price of each lb. and the half of a shilling, therefore the half of 426 is taken, and gives 213s. 10l. 13s.

Example II.

512 lb. of Cheese, at 4d. per lb.

4d. is  $\frac{1}{3}$  |  
of 1s. |

$$\begin{array}{r} 2 \overline{) 017} \mid 0 \mid 8d. \end{array}$$

l. 8—10—8 Answer.

Here 4d. is  $\frac{1}{3}$  of a shilling; therefore the third part of 512 is 170s. and  $\frac{2}{3}$  of a shilling, or 8d. remains.

Note always, That the remainder is of the same name with the dividend, which here is groats, for the pounds of cheese are at a groat each.

Example. III.

246 yards of Ribband, at 3d. per yard

3d. is  $\frac{1}{4}$  |  
of 1s. |

$$\begin{array}{r} 2 \overline{) 06} \mid 1 \mid 6d. \end{array}$$

l. 3: 1: 6 Answer.

Here the yards are divided by 4, because 3d. is the 4th part of a shilling; and it quotes 61 shillings and 2 remains two 3 pences: So the answer is l. 3: 1: 6.

And thus may any proposed question be answered, belonging to the first table, or parts of a shilling; that is by dividing the given number by the denomination of the fraction.



and the quotient will be always shillings, (which the remain-  
ers being known as above) bringing into pounds by dividing  
by 20, &c.

When the price of the integer is at a farthing, a halfpenny  
or three farthings more than the value of the pence mention-  
ed, then for those farthings take a proper part of the forego-  
ing quotient found for the pence, and add them together.

Examples.

249 Ells of Canvass, at  $4\frac{1}{2}$ d. per Ell.

$$\begin{array}{r} 83 \\ 10\frac{1}{4} \text{ or } 4\text{d}, \frac{1}{2} \text{ Answer.} \end{array}$$

$$\begin{array}{r} 2 \mid 0 \mid 9 \mid 3 - 4\frac{1}{2} \\ \text{I. } 4 : 13 : 4\frac{1}{2} \text{ Answer.} \end{array}$$

In this example I divide by 3 for the groats as being the  
third of one shilling, and it quotes 83s. then I consider that a  
halfpenny is the eighth of 4d. therefore I take the eighth part  
of the groat line, or 83s. and that produces 10s. and three  
eighths of a shilling or 4d. halfpenny; then the two lines be-  
ing added together, make 93s.  $4\frac{1}{2}$ d. or 4l. 13s.  $4\frac{1}{2}$ d. as in the  
work.

Parts of a Pound.

10s. is  $\frac{1}{2}$  | 254 yards of Cloth, at 10s. per yard.

I. 127 Answer.

Here the half of 254 is taken, because 10s. is the half of  
pound.

s. d. | 972 Gallons at 6s. 8d. per Gallon.  
6-8 $\frac{1}{2}$  |

I. 324 Answer.

Here the third part is taken, because 6s and 8d. is the  
third of a pound; and the answer is l. 324.

And thus may any question proposed be answered, belong-  
ing to the second table, or parts of a pound; that is by divi-  
ding the given number by the denominator of the fraction,  
and the quotient will always be pounds: and if any thing re-  
mains, it is always so many halves, thirds, fourths, or fifths,  
&c. of a pound, according to the denominator that you di-  
vide by.

If the price be shillings and pence, or shillings, pence, and  
farthings, and no even part of a pound; then multiply the

given number by the shillings in the price, and take even parts for the pence, or pence and farthings and add the several lines together, and they will be shillings; which shillings bring into pounds, as before.

Example.

| lb.                      | s.                       | d.                            | Ells.            | s.         | d.              |
|--------------------------|--------------------------|-------------------------------|------------------|------------|-----------------|
| 426                      | at 4—                    | 9                             | 216              | at 2—      | 3 $\frac{1}{2}$ |
| 4                        |                          |                               | 2                | per Ell.   |                 |
| <hr/>                    |                          |                               | <hr/>            |            |                 |
| 6d. $\frac{1}{2}$        | 1704                     |                               | 432              |            |                 |
| 3d. $\frac{1}{4}$        | 213                      |                               | 64 $\frac{1}{2}$ | 54         |                 |
|                          | 106 $\frac{1}{2}$ or 6d. |                               | 9                |            |                 |
|                          | <hr/>                    |                               |                  |            |                 |
| 2   0) 202               | 36                       |                               | 2   0) 49        | 58.        |                 |
| l. 101 :                 | 36 Answer.               |                               | l. 24 :          | 15 Answer. |                 |
|                          | 396                      | gallons of brandy, at 7s. 9d. |                  |            |                 |
|                          | 7                        | per gallon.                   |                  |            |                 |
|                          | <hr/>                    |                               |                  |            |                 |
| 6d. $\frac{1}{2}$ of 1s. | 2772                     |                               |                  |            |                 |
| 3d. $\frac{1}{4}$ of 6d. | 198                      |                               |                  |            |                 |
|                          | 99                       |                               |                  |            |                 |
|                          | <hr/>                    |                               |                  |            |                 |
| 2   0) 306               | 9                        |                               |                  |            |                 |
|                          | <hr/>                    |                               |                  |            |                 |

l. 1539 Answer.

When the price is 10d. only annex 0 to the right of the given number, (which is multiplying by 10) and they are pence; which divide by 12 and by 20.

Example. 426 lb. of Hops; at 10d. per lb.

$$\begin{array}{r}
 12 \overline{) 4260} \\
 \underline{2 \mid 0) 35 \mid 5}
 \end{array}$$

l. 17—5 Answer.

When the price is 11d. set down the quantity twice in the form of Multiplication, and add the two lines together: then divide by 12, and by 23.

Example.

Example.

426 lb. of Copper, at 11 l. per lb.

426

$$\begin{array}{r} 12 \overline{) 4686 \text{ pence.}} \\ 2 \mid 0 \overline{) 39 \mid 0 \mid 6} \end{array}$$

l. 19 10 6.

If the price be  $11\frac{1}{2}$  take half of the uppermost line, &c.

Example.

942 lb. of Tobacco, at  $11\frac{1}{2}$  d. per lb.

942

471

$$12 \overline{) 10833 \text{ pence.}}$$

$$2 \mid 0 \overline{) 90 \mid 2-9 \text{d.}}$$

l. 45 : 2 : 9d. Answer.

When the price is 1s. only, divide by 20

Example.

2 l 0 96 l 4 lb. of Tobacco, at 12d. per lb.

l. 42. 4 Answer.

When the price is 2s. it is done at sight, by doubling the last figure towards the right hand, and setting it apart for shillings; and the figures towards the left are pounds.

Example.

596 gallons of Spirits, at 2s. per gallon.

l. 59—12 Answer. Here the double of 6 is 12, and the 59 are pounds.

From this method of working by 2s. a multitude of examples may be most expeditiously wrought, viz.

| Ells.                             | Yards.                      |
|-----------------------------------|-----------------------------|
| 444 of Cambric.<br>at 5s. 9.      | 426 at 3s. 6d. per<br>yard. |
| 44—8 at 2s.                       | 42—12 at 2s.                |
| 44—8 at 2s. 1s. $\frac{1}{2}$ 2s. | 21—6 at 1s.                 |
| 22—4 at 1s. 6d. $\frac{1}{2}$     | 10—13 at 6d.                |
| 11—2 at 6d.                       |                             |
| 5—11 at 3d. Ans.                  | 1. 74—11 at 3s. 6d          |

Answer, l. 127—23 at 5s. 9d.

L

The

The operation of these two examples is so intelligibly wrought, that there is no need of verbal explanation.

Again, 548 yards of broad Cloth, at 12s 6d. per yard.

1. 54—16 at 2s.  
6 times 2s is 12s.

6d. is | 328—16 at 12s.  
 $\frac{1}{4}$  of 2s | 13—14 at 6d.

Note, That 13l. 14s. is  
the fourth part of 54l. 16s.  
the two shilling line.

1. 342—10 Answer.

Or multiply by 12s and take half of the given number for the 6d thus :

$$\begin{array}{r} 548 \\ 12 \\ \hline 6576 \\ \frac{1}{2})274 \\ \hline 2 \mid 0)685 \mid 0 \end{array}$$

1. 342—10 Answer.

When the price is an even number of shillings, multiply the given number of integers by half the price, and double the first figure of the product for shillings, and carry, as is usual in Multiplication; and the other figures towards the left will be pounds.

Example.

266 yards of Cloth, at 14s per yard.  
7 the half of 14s

1. 207 : 4 Answer.

Here 7 times 6 is 42, the double of 2s is 4s, &c.

When the price is an odd number of shillings, work for the even number as above; and for the odd shillings take the one twentieth of the given number, and add them together.

Example.

496 gallons of Citron Water, at 17s per gall.  
8 the half of 16.

$$\begin{array}{r} 1. 396—16 \\ 24—6 \end{array}$$

1. 421—12 Answer.



In this example I say, 8 times 6 is 48; the double of 8 is 16s and carry 4; then 8 times 9 is 72, and 4 is 76; 6 and carry 7; and 8 times 4 is 32, and 7 is 39; then the half of 4 is 2, &c.

I have not here room to speak of the various and almost infinite methods and Rules of practice, (having several other subjects and things to treat on) but shall leave some general rules, which, if heedfully noted, will be of great use to learners; and are these, viz.

1. When the price is parts of a farthing, or of a penny, as three fourths, five sixths, seven eights, &c. then multiply the integers by the numerator, and divide by the denominator, and the result will be either farthings or pence; which reduce to pounds, &c.

When the price is pence, and no even part of a shilling; as suppose 5d 7d 8d or 9d. then it may be done by taking their parts, as 3d and 2d is 5d. and 4d and 3d is 7d, and 4d and 4d is 8d. and 6d and 3d is 9d. but it is an easy and sure way to multiply the given number by 5, 7, 8, or 9, and then the product is pence; which reduce to pounds by reduction.

3. When the price is pence and parts of a penny; as 1d. farthing, 2d halfpenny. or 6d three farthings, then work for the penny by taking the one twelfth, for twopence the one sixth: and for 6d the one half: then for the farthings, take one fourth of the penny line, and for the one-fourth of the twopenny line, and for three fourths, take one eighth of the sixpenny line; then add their results together, and the total will be shillings, which reduce to pounds, by dividing by 20. Or by the sure way of bringing the mixt number into the lowest denomination; as one penny farthing into five farthings, twopence halfpenny into five halfpence, and sixpence three farthings into 27 farthings; then multiply the integers by 5, and the product is farthings, or by 5 halfpence, and the product will be halfpence, or by 27 farthings, and the product will be farthings; which, whether farthings or pence reduce to pounds.

4. When the price is shillings and pence, or shillings, pence, and farthings; multiply the integers by the shillings, of the price, and take parts for the pence, or pence and farthings, &c.

5 If the price be pounds and shillings, or pounds, shillings, pence, and farthings, multiply by the shillings in the price, that is, in the pounds, and shillings, and take parts for the pence and farthings.

6. When the number of integers hath a fraction annexed or belonging to them, as one-fourth, one half, three-fourths &c.

&c. then take one-fourth, one-half, or three-fourths of the price of one of the integers, and add that to the other results.

### *TARE and TRETT, &c.*

Gross Weight, is the weight of the goods in hundred<sup>s</sup> quarters, and pounds, with the weight of the hogshead, cask chest, bag, bale, &c. that contains the goods.

Tare, is allowed to the buyer for the weight of the hogshead, cask, chest, bag, bale, &c.

Trett, is an allowance made for waste, dust, &c. in sundry sorts of goods, as tobacco, cotton, pepper, spices, &c. and is always 4lb per 104lb suttie, and found by dividing the suttie pounds by 26, because 4 times 26 makes 104lb. When the gross weight is brought into pounds, and before the Tare is deducted, they are called pounds gross; and after the Tare is subtracted, the remaining pounds are called pounds suttie. which divided by 26 (as said before) quotes pounds Trett, &c.

### *Tare at so much per Cask, hogshead, bag, &c.*

The allowances for Tare are variously wrought, as by the following examples:

In 12 casks of Indigo, containing 45 C. 1qr. 14lb. gross, Tare, 30lb per cask, how many pounds nett?

| 12 casks        | C.                       | qr. | lb. |
|-----------------|--------------------------|-----|-----|
| 30              | 45                       | 1   | 14  |
| — or            | 45                       |     |     |
| 360 pounds tare | —                        |     |     |
|                 | 45                       |     |     |
|                 | 4542                     |     |     |
|                 | 082 pounds gross.        |     |     |
|                 | subtract 360 pounds tare |     |     |
|                 | —                        |     |     |

Answer, 4722 pounds nett.

In this example, the lbs Tare of one cask are multiplied by the number of casks, and the product is 360 lbs. Tare and the gross weight is reduced into pounds by the method shewn in the reduction of weight, and then the lbs Tare are deducted from the lbs gross, and the remainder is pounds nett, viz. 4722, as in the work.

When the tare is at so much per Cwt. multiply the number of hundreds by the Tare, and take parts for the odd weight, and add it to the Tare found by Multiplication, and divide

divide it by 112, to bring it into gross weight, in order for subtraction.

Example.

What is the nett weight of 12 casks of Argol, weight gross.

84 C. 2 qrs. 14 lb.

14 Tare per C.

336

84

7 for half C.

1½ for 14 lb.

112) 1184½ (10 C.

112

84 lb or half a C. and 8 lb.

The Tare in the last example is to be found by the foregoing directions, 10 C. 2 qrs. 8½ lb. which subtracted as in the work, leaves 74 C. 0 qrs. 5½ lb. for the nett weight.

But the foregoing example may be sooner done by Practice, thus:

C. qrs. lb.

14 lb. is ⅛ of C. 8 ) 84—2—14 Gross.

sub. 10—2—8½

74—0—5½ Nett.

In this method the gross weight is divided by 8, because 14 lb. is one eighth of 112 lb. and the remainder is reduced into the next inferior name, and still divided by 8, to the end, and then deducted as above, and the nett weight is the same as by the other way. And so may any Tare per C. be found, if the Tare be an even part of 112 lb. as 14 is one eighth, and 7 lb. is the half of that, and 16 lb. is one seventh, and 8 lb. is one half of that, &c. that is, if the Tare be at 7 lb. per C. find it for 14 lb. as before, and then take the half of that for 7 lb. per C. Tare, and the like for 8 lb. per C. Tare; take one seventh for 16 lb. and then the half of that for 8 lb. per C. Tare.

Of TRET.

What Trett is, when allowed, and how found, hath been said already: now I shall give an example for explanation, as follows:

Bought

Bought 6 hogsheads of tobacco, containing of Gross and Tare as follows, viz.

| No. | C.  | qrs. | lb. | lb. |
|-----|-----|------|-----|-----|
| 1   | wt. | 4    | 1   | 20  |
| 2   |     | 5    | 2   | 19  |
| 3   |     | 6    | 3   | 18  |
| 4   |     | 7    | 3   | 12  |
| 5   |     | 8    | 2   | 13  |
| 6   |     | 9    | 1   | 14  |

Suttle  
26)4198(161 lb.  
26..

169

156

38

26

12

42—3—12 602

42

42

42 | 96

4800 Pounds Gross,  
subtract 602 Pounds Tare.

4198 Pounds Suttle.  
deduct 161  $\frac{4}{7}$  Pounds Trett.

4036  $\frac{1}{7}$  Pounds Nett.

There are some few other rules, such as Barter, or Exchanging goods for goods; also Exchange for coin, profit, loss, &c. but all of them being done either by the Rule of Three, or by rules of Practice, it is therefore here unnecessary to enlarge upon them.

### OF FRACTIONS *Vulgar and Decimal.*

**W**HAT Fractions are, hath already been hinted in the Rule of Division, from whence they arise; for the remainder is a part of a dividend remaining undivided; as admit 54. is divided into twelve equal parts, the quotient is 4, and the remainder 6; so that here 6 remains as yet undivided by 12, and is therefore 6 parts in 12, or six twelfths equal to a half: for 6 is the  $\frac{1}{2}$  of 12; and the remainders are usually set down in this form  $\frac{6}{12}$  and when so, the expression is called a fraction, whose parts are understood by these names, viz.

6 Numerator.

12 Denominator.

The Numerator is above the short line, and sheweth the number of parts signified by the fraction; and the Denominator stands under the line, and declares the number of parts into



into which the integer or whole number is divided, as above 54. is divided i to 12 parts, and the quotient says there are 4 times 12 contained in 54, and 6 remains. which is six twelfths of a pound, or 10s as above said.

Fractions are thus set down and read, viz.  $\frac{1}{4}$ , one fourth ;  $\frac{1}{2}$ , one half ;  $\frac{1}{3}$ , one third ;  $\frac{1}{5}$ , one fifth ;  $\frac{1}{6}$ , one sixth ;  $\frac{2}{3}$ , two thirds ;  $\frac{2}{4}$ , two fourths ;  $\frac{2}{6}$ , two sixths ;  $\frac{5}{7}$ , five sevenths, &c.

Fractions are either proper or improper : A proper fraction hath its numerator less than the denominator, as  $\frac{5}{6}$ , five sixths,  $\frac{24}{56}$ , twenty-four fifty-sixths, &c.

An improper fraction hath its numerator greater than the denominator ; as  $\frac{7}{3}$  seven thirds ;  $\frac{48}{15}$ , forty eight fifteenths, &c.

Again fractions are either simple or Compound ; simple when part of an integer or thing hath but one numerator, and one denominator, as  $\frac{1}{4}$  of a pound sterling,  $\frac{1}{2}$  of a cwt.  $\frac{1}{3}$  of a tun,  $\frac{1}{6}$  of a gallon, &c. Compound, is a fraction of a fraction, as the  $\frac{1}{2}$  of  $\frac{1}{4}$  of a pound sterling, which is equal to half a crown ; or when one is divided into any number of parts, and of those parts again subdivided into parts, &c.

Fractions are of two kinds viz vulgar and decimal. Vulgar fractions are as declared before. Decimal Fractions are artificially expressed by setting down the numerators only, the denominators being understood ; and are always an unit, with as many cyphers annexed as there are places in the numerator ; and therefore must be either 10, or some power of 10, as 100, 1000, 10,000, or 100,000, &c.

Decimal fractions appear as whole numbers (and are in the general so wrought) but are distinguished from them by a point or comma prefixed, thus, .5 is read five tenths ; .32 thirty two hundredths ; and .256 two hundred, 56 thousandths : But of Decimal Fractions and their use hereafter.

Reduction of Vulgar Fractions, is to fit or prepare them for Addition, Subtraction, &c.

1. To reduce a mixt number to an improper Fraction.

Rule, Multiply the integer by the denominator, and take in the numerator.

Example.

Reduce 22 gallons  $\frac{4}{5}$  to an improper fraction, thus:

4

51 New numerator.

Ans.  $\frac{51}{5}$ , or 51 quarts.

2. To reduce an improper Fraction to a whole or mixt Number.

Rule, Divide the numerator by the denominator.

Example.

## Example.

Reduce the last example to a whole or mixt number, viz

$$\begin{array}{r} 51 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 4) 51 \\ \hline \end{array}$$

4

2

3 Remainder, equal to  $\frac{3}{4}$

Here 12 gallons is the whole number,  $\frac{3}{4}$  the fraction; the same with three quarts.

## 3. To reduce Fractions to a common Denominator.

Rule. Multiply the numerator of each fraction into all the denominators except its own, and the product will be a numerator to that fraction; and then do so by the next &c.

## Example.

Reduce  $\frac{3}{4}$ ,  $\frac{1}{2}$ , and  $\frac{1}{3}$  of any integer to a common denominator; say, twice 4 is 8, and 6 times 8 is 48, for a new numerator to  $\frac{3}{4}$ ; then say 3 times 3 is 9, and 6 times 9 is 54, for a new numerator to  $\frac{1}{2}$ ; lastly, say 5 times 4 is 20, and 3 times 20 is 60, the numerator to  $\frac{1}{3}$ : then to find the common denominator, say 3 times 4 is 12, and 6 times 12 is 72, the common denominator, so that  $\frac{48}{72}$  is equal to  $\frac{3}{4}$ ,  $\frac{54}{72}$  to  $\frac{1}{2}$  and  $\frac{60}{72}$  to  $\frac{1}{3}$ , which may be thus proved:

$\frac{3}{4}$  of a pound is 13s. 4d.

48

72) 162)  $3\frac{3}{4}$  or  $2\frac{1}{2}$

$\frac{1}{2}$  ditto.

15 0

54

144

$\frac{1}{3}$  ditto

16 8

60

18

2l. 5. or 45 0

48

$4\frac{6}{12}$ ; common denominator.

Here the several numerators are added together, and they make 162; which placed over the common denominator 72 make the improper fraction  $\frac{162}{72}$ , and its value is found as before directed, in the rule for reducing an improper fraction to a whole or mixed number, as may be seen in the foregoing page:

## 4. To reduce a Fractions to its lowest Terms.

Rule. If there are even numbers, take half of the numerator and denominator, as long as you can; and then divide them by any digit number, (i. e. 3, 4, 5, 6, &c.) that will leave no remainder in either.

## Example.

Reduce  $\frac{56}{84}$  into its lowest terms; say the  $\frac{1}{2}$  of 56 is 28, and the  $\frac{1}{2}$  of 84 is 42, and then the  $\frac{1}{2}$  of 28 is 14, and the  $\frac{1}{2}$  of 42 is 21: and so the fraction  $\frac{56}{84}$  is reduced to  $\frac{14}{21}$ . And since they cannot be halved any longer; for though you can halve

halve 14, yet you cannot 21, without a remainder; try therefore to divide them by some other digit number, and you will find that 7 will divide both numerator and denominator without any remainder; then say the 7's in 14 twice; and the 7's in 21 three times: so the fraction  $\frac{14}{21}$  reduced into its lowest terms, will be  $\frac{2}{3}$ , two thirds; which is of the same value as  $\frac{14}{21}$ . The work is done in this form:

$$\begin{array}{r|l|l|l|l} 2 & 2 & 7 & & \\ 56 & | & 28 & | & 14 & | & 2 \\ \hline 84 & | & 42 & | & 21 & | & 3 \end{array}$$

And the proof that  $\frac{2}{3}$  is of the same value with  $\frac{14}{21}$ , will appear by multiplying any integer by the numerator of each fraction, and dividing by the denominator of each fraction.

Example.

Let the integer be 41. Sterling, or 20s

The fraction  $\frac{2}{3}$

The fraction  $\frac{14}{21}$

$$\begin{array}{r} s. \\ 20 \\ 2 \\ \hline 3)40 \\ \hline 13-4d. \end{array}$$

$$\begin{array}{r} s. \\ 20 \\ 36 \\ \hline 84)1120(13s. \\ 84 \\ \hline 280 \\ 252 \\ \hline 28 \\ 12 \\ \hline 336 4d. \\ 336 \\ \hline (0) \end{array}$$

13s. 4d.

Here it is manifest, that by working a fraction in its lowest terms, much time and figures are saved. In one operation, 20 the integer is multiplied by 2, and the product divided by 3, and there remains 1, or  $\frac{1}{3}$  of a shilling, or a groat in the other work.

There are other methods of reducing a fraction to its lowest terms; but none so ready as the foregoing, where it can be used.

To reduce a compound Fraction into a simple one of the same Value.

M

Rule

Rule, Multiply the numerators together for a new numerator and the denominator together for a new denominator.

**Examples.**

Reduce  $\frac{3}{4}$  of  $\frac{1}{2}$  of  $\frac{2}{3}$  of a pound sterling into a simple fraction. Say, twice 3 is 6, and 5 times 6 is 30, the numerator; then 3 times 4 is 12, and 6 times 12 is 72, the denominator; so  $\frac{3}{4}$  of a pound is equivalent to  $\frac{3}{4}$  of  $\frac{1}{2}$  of a pound. Thus proved,  $\frac{2}{3}$  of a pound is 16s. 8d. and  $\frac{1}{2}$  of 16s. 8d. is 12s. 6d. and  $\frac{3}{4}$  of 12s. 6d. is 8s. 4d. the answer and multiply 20s. by 30, and dividing by 72, gives the same answer as in the following work is plain.

|             |         |
|-------------|---------|
| 20          |         |
| 30          |         |
| 72)600(8s.  |         |
| 576         |         |
| 24 remains  |         |
| 12 multiply | 8s. 4d. |
| 72)288(4d.  |         |
| 288         |         |
| (0)         |         |

*To find the Value of any Fraction, whether of Coin, Weight or Measure.*

Rule. Multiply the integer by the numerator, and divide by the denominator; and if any thing remains, multiply by the number of units of the next inferior denomination.

**Example.**

What is the  $\frac{3}{4}$  of a pound, or 20s.? The operation of the foregoing example of proof to the compound fraction of  $\frac{3}{4}$  of  $\frac{1}{2}$  answers this question, and need not be repeated.

Example. Again, what is  $\frac{3}{4}$  of a ton weight?



C.  
20 the integer.  
5 the numerator.

The denominator 6) 100

C. 16—4 remain  
4 qrs. 1 C.

6) 16

qrs. 2—4 remains.  
28 lb. 1 qr.

6) 112

Answer,

6 C. 2 qrs. 18½ lb.

lb. 18½

Here the integer 20 C. is multiplied by the numerator 5 and the product 100, divided by the denominator 6, and the remainder 4, is multiplied by the parts of the next inferior denomination &c. and the answer is 16 C. 2 qrs. 18½ lb. or 2 a pound weight, as in the work.

*Addition of Vulgar Fractions.*

If the fractions to be added have a common denominator, add the numerators together for a numerator, and place over the common denominator,

*Example.*

Add  $\frac{2}{5}$ ,  $\frac{1}{5}$ , and  $\frac{4}{5}$  of a pound sterling together. Say, 2 and 1 is 3 and 4 is 7, the numerator, which place over 5, the common denominator, thus,  $\frac{7}{5}$ ; and this improper fraction  $\frac{7}{5}$  is in value 3½s. for 9 times 4s. (the 5th of a pound) is 36s. for if the numerator 7 be divided by its denominator 5, I say the 5's in 7 once, and 2 remains, which is  $\frac{2}{5}$  of a pound, or 16s.

But if the fractions to be added have unequal denominators, then they must be reduced to a common denominator, by the rule before shewn, before addition can be made; and then proceed as above.

2. When mixed numbers are to be added, work with the fractional parts as before and carry the fractional value to the whole numbers.

*Example.*

Add  $25\frac{1}{4}$  to  $12\frac{3}{4}$  thus:  $2\frac{3}{4}$

12½

l. 38 Ans.

M 2

Here

Here 1 and 3, the numerators, make 4; and  $\frac{4}{4}$  is 1, and 2 is 3, and 5 makes 8; and 1 and 2 is 3, and the answer is 38.

Or they may be reduced into improper fractions, thus:

$$\begin{array}{r} 25\frac{3}{4} \\ 4 \\ \hline 103 \\ 4 \\ \hline \end{array} \quad \begin{array}{r} 12\frac{1}{2} \\ 4 \\ \hline 49 \\ 4 \\ \hline \end{array} \quad \begin{array}{r} 103 \\ 49 \\ \hline 4) 152 \\ 38 \text{ lbs.} \end{array}$$

Here the numerators are added, and their total is 152; which divided by 4, the common denominator, quotes 38, the same answer as above.

3. When compound fractions are to be added to simple ones, reduce the compound fraction to a simple one, as before directed; and then proceed as above.

Add  $\frac{2}{3}$  and  $\frac{1}{4}$ , to  $\frac{1}{2}$  of  $\frac{3}{4}$  of a pound; thus, once 2 is 2, and twice 4 is 8; therefore  $\frac{2}{3}$  is equal to the compound fraction: Then add, say 2 and 3 is 5, and 2 is 7, the new numerator, and  $\frac{7}{8}$  equal in value to 17s. 6d. will be the answer.

*Subtraction of Vulgar Fractions.*

**I**N this rule, the fractions must have a common denominator, or be reduced to one, before deduction can be made.

*Example.*

What is the difference between  $\frac{1}{2}$  and  $\frac{1}{4}$ ? Answer  $\frac{1}{4}$ ; which may be proved by addition: for  $\frac{1}{4}$  and  $\frac{1}{4}$  make  $\frac{1}{2}$ .

Note, The difference between the numerators is the difference of the fraction.

Again, from  $\frac{3}{4}$  of a pound take  $\frac{1}{2}$ : Here the fractions are to be reduced to a common denominator, 36 is the first numerator, and 20 the second numerator; their difference is 16; and 48 is the common denominator; so that  $\frac{16}{48}$  or  $\frac{1}{3}$ , in its lowest terms, is the difference between  $\frac{3}{4}$  of a pound, and  $\frac{1}{2}$  of a pound.

*To subtract a Compound Fraction from a simple one.*

Rule. Reduce the compound fraction to a simple one and then work as before.

*Example.*

From  $\frac{1}{2}$  take  $\frac{2}{3}$  of  $\frac{3}{4}$ ; say twice 8 is 16, and 3 times 9 is 27, therefore  $\frac{16}{27}$  is equal to the compound fraction. Then  $\frac{1}{2}$  and  $\frac{16}{27}$  must be reduced to a common denominator thus; 13 times 27 is 351, the first numerator; 16 times 14 is 224, the second numerator; and 14 times 27 is 378, the common denominator.

denominator. Then subtract 224 the second numerator from 351 the first numerator, and the remainder is 127, which place over 378, the common denominator, thus  $1\frac{127}{378}$  Answer

*When a Simple Fraction is to be deducted from a whole number.*

Rule. Subtract the numerator of the fraction from the denominator, and place the remainder over the denominator, and carry 1 to subtract from the whole number, &c.

Example.

From 12l. take  $\frac{5}{8}$  thus; say 5 (the numerator) from 8 (the denominator) and there remains 3, which place over the denominator 8 thus,  $\frac{3}{8}$ ; then 1 from 12 and there remains 11 so the answer is, l. 11  $\frac{3}{8}$ , or l. 11—7—6.

*Multiplication of Vulgar Fractions.*

Rule. **M**ULTIPLY the numerators into one another for the numerator of the product; and then do the same by the denominators, for the denominator of the product.

Example.

Multiply  $\frac{3}{4}$  of a pound, by  $\frac{5}{6}$  of ditto; say 3 times 5 is 15. the numerator, and 4 times 6 is 24 the denominator: so the answer is  $\frac{15}{24}$ , or in its lowest term  $\frac{5}{8}$ .

You are to note, That multiplication in fractions lessens the product, though in whole numbers it augments it; as above,  $\frac{1}{2}$  or 12s. 6d. is less than  $\frac{1}{3}$  or 16s. 8d. and also less than the other fraction  $\frac{2}{3}$  or 15s. The reason of which I have not here room to insist on; but it is given in my Arithmetic, in Multiplication of vulgar fractions; to which book I refer the reader for that, and sundry enlargements in the several rules of the science of arithmetic.

*To multiply a whole number by a fraction.*

Rule. Multiply the integer by the numerator of the fraction, and place the product over the denominator.

Example

Multiply 56l. by  $\frac{1}{3}$

$$\begin{array}{r} 56 \\ \times 3 \\ \hline 168 \end{array} \left. \begin{array}{l} \\ \\ \end{array} \right\} \text{Facit.}$$

This improper fraction  $1\frac{2}{3}$  reduced according to rule makes but 42l. which is less than 56; and confirms what was

M. 3

before

before asserted, viz. what multiplication of fractions lessen the product, &c.

3. *To multiply a simple by a compound Fraction.*

Rule. Reduce the compound fraction to a simple one, as before taught, and work as above.

Example.

Multiply  $\frac{6}{8}$  of a pound by  $\frac{2}{3}$  of  $\frac{3}{4}$  of a pound, say, 6 times 9 is 36, and 8 times 12 is 96. So that the answer is  $\frac{36}{96}$  or  $\frac{3}{8}$  in its lowest terms; equal to 7s. 6d.

*Division of Vulgar Fractions.*

Rule. **M**ULTIPLY the numerator of the divisor into the denominator of the dividend, and the product is the denominator of the quotient, and then multiply the denominator of the divisor into the numerator of the dividend, and the product will be the numerator of the quotient.

Example.

Divide  $\frac{16}{3}$  by  $\frac{2}{3}$  quotient.

Here 16 multiplied by 2, gives 32; and 15 by 3, gives 45; so that the quotient is  $\frac{32}{45}$  equal to  $1\frac{1}{3}$ , as in the work.

Again suppose  $\frac{7}{8}$  was divided by  $\frac{2}{3}$ , the quotient will be  $\frac{21}{16}$  equal to 1 integer or whole thing. And so for any other example.

*Reduction of Decimal Fractions.*

**W**HAT a decimal fraction is, hath been already shewn. The next step is, how to reduce a vulgar fraction into a decimal: which is no more than to annex cyphers in discretion (that is 2, 3, 4. &c. ) to the numerator, and then divide it by the denominator.

Example.

Reduce  $\frac{3}{4}$  of a pound sterling to a decimal.

4) 3, 00 } that is 75 hundredths, equal to 3 qrs of any thing  
       75 } whether money, weight, measure; &c. as being  
       of 100; and so 25 hundredths is, in decimals, the quarter  
       of any thing, as being  $\frac{1}{4}$  of 100; and five tenths expresses the  
       half of any thing, as being the  $\frac{1}{2}$  of 10.

In reduction of decimals sometimes it happens that a cypher or cyphers must be placed to the left hand of the decimal, to supply the defect or want of places in the quotient.



of the division. — In this case always remember, that so many cyphers as you annex to the denominator of the vulgar fraction, so many places you must point off in the quotient towards the left hand; but if there be not so many places to point off, then you must supply the defect by placing a cypher or cyphers to the left of the decimal.

Example.

Reduce 9d. or  $\frac{9}{12}$  to the decimal of a pound sterling.

240) 9,0000 (,0375

720

1800

1680

1200

1200

(0)

Here are but three places in the quotient, viz. 375; and therefore I cannot point off 4 for the four cyphers annexed to 9; wherefore I prefix 0 to the left of the quotient 375, thus, 0,375, and then it is 375 ten thousandth parts of an integer.

The more cyphers you annex, the nearer you bring your decimal to the truth: but in most cases, four cyphers are sufficient. But when you are to reduce  $\frac{1}{2}$ ,  $\frac{1}{4}$ , or  $\frac{1}{8}$  (as above) of an integer to a decimal, or any number of shillings to a decimal of a pound, two cyphers are sufficient. One example more.

Example 3.

Reduce 3 farthings to the decimal of a pound, that is, the vulgar fraction  $\frac{3}{16}$ , 960 farthings being a pound.

960) 3,000000 (0,03125. The work being performed according to the division, with two cyphers prefixed, quotes 3003125, 3125 ten hundred thousandth parts of a pound. By the same method, the vulgar fractions of weight, measure, &c. are reduced to decimals.

Example 4.

How is 12 pounds weight expressed in the decimal of 1 C. weight Avoirdupoise, 12lb. the vulgar fraction is  $\frac{12}{112}$ , and the decimal, 1071 found as before, thus,

112) 12,0000 (,1071

112

So &c.

The remainder 48 is not worth notice, being less than 10000 the part of an unit or 1.

Example

## Example V.

How is 73 days brought to the decimal of a year? vulgarly thus expressed  $\frac{73}{365}$

365) 73.0 (.2 Ans 2 tenths.  
730

Thus proved, 36,5  
36,5

(0)

Here 365, the days in a year, is divided by 10 twice; and the quotients added together, they make 73 days.

*Valuation of Decimals.*

**T**O find the value of a decimal fraction, whether of coin, weight, measure, &c.

**Rule.** Multiply the decimal given, by the units contained in the next inferior denomination, and point off as many places from the right hand as you have in your decimal; so those figures towards the left of the point are integers or whole numbers; and those on the other side towards the right hand are parts of one or unity; that is, so many tenths, hundredths, thousandths, or ten thousandths of one of those integers, whether a pound, a shilling, or a penny, &c. or of a ton, a hundred, a quarter, a pound weight, &c. And so of any other integer, or of what kind or quality soever.

*Examples.*

476 parts of a pound sterling.  
20 shillings a pound.

9,520  
12 pence 1 shilling.

Ans. 6,240

9s 6d. 960  
parts, or  $\frac{1}{2}$   
of 1d.

4 farthings 1 penny:

960 parts, or almost  $\frac{1}{2}$  of 1d.

476 parts of a ton wt.  
20 C. 1 ton.

9,520  
4 qrs. 1 C.

2,080  
28 lb. 1 qr. of C:

Answer

9 C. 2 qrs, 2 lb, 240 parts,

2,240

In the example of money, I multiply the fraction by 20 and point off 520 for the three places in the decimal, &c and the answer is 9s. 6d  $\frac{1}{4}$  nearly.

In the example of weight I proceed as in that of money, (the fraction being the same,) but with different respect to the inferior denominations; and the answer is 9 C. 2 qrs. 2 lb.  $\frac{240}{1000}$  of a pound wt.

To find the true value of a decimal in money in a briefer method, viz.

Rule. Always account the double of the first figure (to the left hand) for shillings; and if the next to it is 5 reckon a shilling more; and whatever is above 5, call every one ten; and the next figure so many ones as it contains: which tens and ones call farthings; and for every 24, abate 1: as admit the last example of money, viz. 476; the double of 4 is 8; and there being one 5 in 7, (the next figure) I reckon one shilling more, which makes 9, and there being 2, (in the 7 above 5,) they are to be accounted tens, or 20; which with the next figure 6, being so many ones, making 26 farthings; and abating 1 for 24, they give 6d. and a farthing more.

### Addition of Decimals.

Is the same in operation as in whole numbers; only in setting down, care must be taken that the decimal parts stand respectively under like parts; that is, primes under primes, seconds under seconds, thirds under thirds, &c. and the integer stands as in whole numbers.

#### Example.

| Integers | Thirds | Seconds | Primes | Parts | Primes | Seconds | Thirds | Fourths | Fifths |
|----------|--------|---------|--------|-------|--------|---------|--------|---------|--------|
| 4        | 6      | 4       | 2      | 6     | 4      | 7       | 9      | 6       | 2      |
| 7        | 4      | 4       | 2      | 6     | 4      | 2       | 6      | 4       | 2      |
| 9        | 0      | 6       |        | 6     | 0      | 7       | 6      |         |        |
| 6        | 5      | 7       | 9      | 4     | 0      | 0       | 0      | 4       |        |
| 4        | 2      | 0       | 0      | 5     | 5      |         |        |         |        |

4 3 7 . 7 0 5      1 . 4 7 6 0      2 . 1 4 9 8 2

Note, There must be as many places pointed off, as there are in that number which has most decimal places.

The casting up of the foregoing examples, is the same with the addition of one denomination, in whole numbers; the total of the first (supposing them pounds sterling) as 437l. and 705 parts. The second is 1l. and 4760 parts. And the third is 2l. and 14982 parts.

### Subtraction

*Subtraction of Decimals.*

THE numbers must be placed as before in Addition, and then proceed as in Subtraction of numbers of one denomination.

l. pts.

46,51

9,24

37,27

l. pts.

140,42

91,7462

48,6738

l. pts.

4762,0

0,472

4761,52

*Multiplication of Decimals.*

Here the placing the numbers and the operation is the very same as in the whole numbers: remember only to point off towards the right hand so many places for decimals, as you have decimal places, in both multiplicand and multiplier.

Example.

(1)

24,6

2,5

1230

492

61,50

(4)

367214

,006

,00043284

(2)

4602

1075

23010

32214

345,150

(5)

,083

,16

- 498

083

,01328

(3)

,2796

26

16776

5192

7,2696

(6)

4,25

1,09

3825

4250

45325

Note, That where there are not a competent number of figures or places to point off, such defect is supplied with cyphers to the left hand; as in the 4th and 5th examples according to what was before hinted in reducing a vulgar fraction to a decimal.

*Division of Decimals.*

IS the same in operation as in whole numbers; the only difficulty is to know how many decimal places to point off towards the left hand of the quotient; to which end remember this rule: Observe how many decimal places there

-and



are in the divisor, and the dividend, and find the difference; and whatsoever it is, so many places must be pointed off to the right hand of the quotient.

**Examples.**

Divide 12,345670 by 6,789) 12,345670 (1,818  
6789...

In this example the dividend hath three decimal places more than the divisor, wherefore I point off three places to the right hand of the quotient, viz. 818; so the quotient is 1 integer, and, 818 parts.

$$\begin{array}{r} 55566 \\ 54312 \\ \hline 12547 \\ 6789 \\ \hline 57580 \\ 54312 \\ \hline \end{array}$$

Divide 3,46000 by 1,23) 346000 (2,813  
246...

Here the difference between the decimal places in the divisor and the dividend is three places, as in the foregoing examples; therefore 813 is pointed off for the decimal fraction, and the quotient is 2 integers, and, 813 thousandths of an integer.

$$\begin{array}{r} 1000 \\ 984 \\ \hline 160 \\ 123 \\ \hline 370 \\ 369 \\ \hline (1) \end{array}$$

Thus much for fractions vulgar and decimal: wherein I have been as concise as possible and worked with as much plainness as I could invent.

**BOOK-KEEPING.**

**T**HE next qualification to fit a man for business after Arithmetic, is the art of Book-keeping, or Merchant's Accounts, after the Italian manner, by way of double entry.

It is not without good reason that most people of business and ingenuity, are desirous to be masters of this art; for if we consider the satisfaction that naturally ariseth from an account well kept, the pleasure that accrues to a person by seeing what he gains by each species of goods he deals in, and his whole profit by a year's trade; and thereby also to know

know the true state of his affairs and circumstances, so that he may, according to discretion, retrench or enlarge his expences, &c. as he shall think fit.

This art of Book-keeping, or Merchant's Accounts, is talked of by many, but truly understood but by very few; for every petty schoolmaster, in any bye corner, will be sure to have Merchant's Accounts expressed on his sign, as a principal article of his ability in teaching; though, strictly speaking, for want of the practical part, he knows hardly any thing of the matter, and is consequently incapable of teaching it.

Instructions, Notes, Rules and Directions, for the right ordering and keeping Merchant's Accounts by the excellent order of charge and discharge, commonly called Debtor and Creditor.

### *Of the Books in use.*

THE books of principal use are the Waste book, (by some called the memorial) Journal, and Ledger.

#### *Waste-Book.*

In this book must be daily written whatever occurs in the way of trade; buying, selling, receiving, delivering, bargaining, shipping, &c. without omission of any one thing, either bought or sold, borrowed; &c.

The Waste-book is ruled with one marginal line, and three lines for pounds, shillings and pence, and the day of the month and year of our Lord, is inserted in the middle of the page. In this book, any one may write, and, on occasion, any thing may be blotted out, if not well entered, or any error be made.

#### *Journal.*

INTO this book every article is brought out of the Waste-book, but in other terms, in a better style, and in a fairer hand, without any alteration of cyphers or figures; and every parcel one after another, are promiscuously set without intermission; to make the book, or several entries of it of more credit and validity in case of any law dispute, or any other controversy that may happen between merchant and merchant. In this book you are to distinguish the debtor and creditor; (or in other terms the debit and credit;) and to this book you must have recourse for the particulars of an account, which in the Ledger are entered in one line. In this book also the day of the month is usually placed in the middle of the page; it is ruled with double marginal lines, for references to the Ledger,

ger  
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pos  
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each  
day  
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ger, and with three lines for l. s. d. as the Waste book.

*Of the Ledger.*

FROM the Journal, or Day book, all matter or things are posted into the Ledger, which, by the Spaniards, is called *Elibro grande*, as being the biggest book, or chief of Accounts. The left hand side of this book is called the debtor, and the right the creditor side; and the numbers or folios of each side must be alike as debtor 45, and 45 creditor. The day of the month in this book is set in a narrow column on the left hand, and the month on the left of that; but where I kept books, the number in the narrow column referred to the Journal page, and the month and day was placed in the broad column, to the right of that: and at the head of each folio is the name of the place of residence, and the year of our Lord, as thus:

London, anno—1794

But the example of these several books hereafter following will make the foregoing hints of them much more intelligible. The following is a general rule, upon which most of the entries in book keeping depend, viz.

All things Received, or the Receiver, are Debtors to the Delivered or Deliverer.

*Waste-book Entry.*

London January 1. 1788.

|                                               |    |    |    |
|-----------------------------------------------|----|----|----|
| Bought of William Wilkins, of Norton, Fal-    | L. | s. | d. |
| gate, 120 yards of white sarcenet, at 2s. 3d. |    |    |    |
| per yard, to pay in two months,               | 13 | 10 | —  |

*The Journal Entry of the same*

|                                                  |    |    |   |
|--------------------------------------------------|----|----|---|
| Wrought silk debtor to William Wilkins, 13l.     |    |    |   |
| 10s. for 120 yards of white sarcenet, at 2s. 3d. |    |    |   |
| per yard, to pay in two months.                  | 13 | 10 | — |

In this example the wrought silks are received and therefore debtor to W. Wilkins the deliverer.

Again.

*Waste-book*

January 4.

|                                              |    |    |   |
|----------------------------------------------|----|----|---|
| Sold Henny Harrington 246lb. nett of indigo, |    |    |   |
| at 6s. 6. per lb. to pay in 3 months.        | 79 | 19 | — |

*Journal Entry.*

|                                             |    |    |   |
|---------------------------------------------|----|----|---|
| Henry Harrington, Dr. to indigo, for 246lb, |    |    |   |
| nett at 6s. 6d. per lb, to pay in 3 months. | 79 | 19 | — |

N

Once

Once more.

*Waste-book Entry.*

|                                         |   |          |
|-----------------------------------------|---|----------|
| Bought of George Goodinch, senior, viz. |   |          |
| Cheshire Cheese, 430 C $\frac{1}{2}$ at | } | l. 502 5 |
| 23s. 4d. per C.                         |   |          |
| Butter, 50 Firkins, qt. nett            | } | 35 0     |
| 2800lb. at 3d. per lb.                  |   |          |
| To pay at 6 months.                     |   | 537 09   |

*Journal Entry.*

|                                              |      |          |
|----------------------------------------------|------|----------|
| Sundry accounts, Dr. to George Goodinch,     |      |          |
| l. 537 05                                    | viz. |          |
| 4 Cheshire cheese, for 430 C $\frac{1}{2}$ . | }    | l. 502 5 |
| at 23s. 4d. per C.                           |      |          |
| 5 Butter, for 50 firkins, qt. nett           | }    | 35 0     |
| 4800lb. at 3d per lb.                        |      |          |
| To pay in six months.                        |      | 537 09   |

*Waste-book.*

|                              |   |           |
|------------------------------|---|-----------|
| Sold James Jenkins, viz.     |   |           |
| White sarcenet, 50 yards,    | } | l. 7 10 0 |
| at 3s. per yard,             |   |           |
| Indigo, 50lb. at 7s. per lb. |   | 17 10 0   |

*Journal Entry of the last.*

|                                               |   |           |
|-----------------------------------------------|---|-----------|
| 6 James Jenkins, Dr. to sundry accounts, viz. |   |           |
| 7 To white sarcenet for 50 yards.             | } | l. 7 10 0 |
| at 3s. per yard.                              |   |           |
| To indigo, for 50lb. at 7s. per lb.           |   | 17 10 0   |

From these few examples of entry, it may be observed that an experienced person in accounts, and a good writer may keep a Journal without a Waste-book, or a Waste-book without a Journal, since they both import one and the same thing, though they differ a little in words or expressing.

But however, I shall give methods of keeping each as much room will give me leave.



The Waste-book.

London, January 1. 1788.

|                                                                                                 |   | l. | s.   | d.         |
|-------------------------------------------------------------------------------------------------|---|----|------|------------|
| An inventory of all the money, goods, and debts, belonging to me A. B. of London merchant, viz. |   |    |      |            |
| In cash.                                                                                        |   | l. | 3500 | 0 0        |
| In tobacco, 4726lb. at                                                                          | } |    |      |            |
| 9d. per lb.                                                                                     |   |    | 177  | 4 6        |
| In broad cloth, 6 pieces,                                                                       | } |    |      |            |
| at 50s. per piece.                                                                              |   |    | 15   | 0 0        |
| Dowlas, 1000 ells, at 2s.                                                                       | } |    |      |            |
| 4d. per ell.                                                                                    |   |    | 116  | 13 4       |
| Canary wines, 9 pipes,                                                                          | } |    |      |            |
| at 30l. per pipe.                                                                               |   |    | 270  | 0 0        |
| Due to me from Henry                                                                            | } |    |      |            |
| Bland, per bond.                                                                                |   |    | 60   | 0 0        |
|                                                                                                 |   |    |      |            |
|                                                                                                 |   |    |      | 4138 17 10 |

(1)

Journal.

Inventory, &c.

Sundry accounts, Dr. to stock.

l. 4138 17 10 viz.

|   |                           |   |    |      |       |
|---|---------------------------|---|----|------|-------|
| 1 | Cash.                     |   | l. | 350  | 0 0   |
|   | Tobacco for 4726lb. at    | } |    |      |       |
|   | 9d. per lb.               |   |    | 177  | 4 6   |
| 1 | Broad cloth for 6 pieces, | } |    |      |       |
|   | at 50s. per piece.        |   |    | 15   | 0 0   |
| 1 | Dowlas for 1000 ells, at  | } |    |      |       |
|   | 2s. 4d. per ell.          |   |    | 116  | 13 4  |
| 1 | Canary wines for 9 pipes, | } |    |      |       |
|   | at 30l. per pipe,         |   |    | 270  | 0 0   |
| 3 | Henry Bland due on bond.  |   |    | 60   | 0 0   |
|   |                           |   |    | 4138 | 17 10 |

I shall make one page serve for Waste-book and Journal-entries, to save room, and also to have both methods of entry under eye, to make them more intelligibly useful to the reader, he hereby being not obliged to turn over the leaf to see their difference of entry.

## Waste-book.

London, January 1. 1788.

|                                                   |           |     |    |    |
|---------------------------------------------------|-----------|-----|----|----|
| Owing to Hen Webb, by note of my hand.            | 1. 50 0 0 | l.  | s. | d. |
| Ditto, to Roger Ruff, the balance of his account. | 16 12 4   |     |    |    |
| Ditto, to Henry Hern, due the 4th of May next.    | 62 0 0    |     |    |    |
|                                                   | <hr/>     | 128 | 12 | 4  |

## Journal.

|                                               |         |     |    |   |
|-----------------------------------------------|---------|-----|----|---|
| Stock debtor to sundry accounts, viz.         |         |     |    |   |
| L 128 12 4                                    |         |     |    |   |
| To Henry Webb, by note of my hand             | 50 0 0  |     |    |   |
| To Roger Ruff for the balance of his account, | 16 12 4 |     |    |   |
| To Henry Hern, due the 4th of May next,       | 62 0 0  |     |    |   |
|                                               | <hr/>   | 128 | 12 | 4 |

## Waste-book.

London February 2. 1788.

|                                       |        |    |   |  |
|---------------------------------------|--------|----|---|--|
| Sold Thomas Townshend, viz.           |        |    |   |  |
| 6 246 lb. of Virginia cut Tobacco, }  |        |    |   |  |
| at 14d. per lb.                       | 14 7 0 |    |   |  |
| 1 460 ells of Dowlas, at 3s. per ell. | 69 0 0 |    |   |  |
|                                       | <hr/>  | 83 | 7 |  |

## Journal. February 2.

|                                           |        |    |   |  |
|-------------------------------------------|--------|----|---|--|
| 6 Thomas Townshend, Dr. to sundries, viz. |        |    |   |  |
| To tobacco, for 246lb. at 14d. per lb     | 14 7 0 |    |   |  |
| 1 To Dowlas for 460 ells, at 3s. per ell, | 69 0 0 |    |   |  |
|                                           | <hr/>  | 83 | 7 |  |

## Waste-book February 24.

|                                                                                    |     |  |  |  |
|------------------------------------------------------------------------------------|-----|--|--|--|
| Bought of Leonard Legg, four pipes of canary at 28lb. per pipe. To pay in 6 months | 112 |  |  |  |
|------------------------------------------------------------------------------------|-----|--|--|--|

## Journal. February 24.

|                                                                                      |     |  |  |  |
|--------------------------------------------------------------------------------------|-----|--|--|--|
| Canary wines, Dr. to Leonard Legg, for 4 pipes at 28l. per pipe. to pay in 6 months. | 112 |  |  |  |
|--------------------------------------------------------------------------------------|-----|--|--|--|

The short lines ruled against the Journal-entries are may be termed posting lines and the figure on the top of the lines denotes the folio of the Ledger where the debtor is entered, and the figures under the line shews the folio of the Ledger where the credit is entered; and the other small figure

figures against the sundry debtors, or sundry creditors, (whether goods or persons,) shew also in what folios of the Ledger they are posted..

The accounts of persons or things are kept in the Ledger, on opposite pages in which those in which the Journal are said to be debtors are entered on the left-hand page with the word *To*, and those to which they are said to be creditors, are entered right hand page, with the word *By*.

For instance, the last Journal entry should be posted on the left hand, or the debtor side, of the account of Canary wines thus:

1788.  
Feb. 24. To Leonard Legg — 4 pipes — 112 0 0

And the same should be posted on the right hand, or creditor side, of the account of Leonard Legg, thus:  
1788.

Feb. 24. By Canary wines, to pay in six months, 112 0 0

There are several other books used by merchants besides those three before mentioned; as the Cash book, which is ruled as the Ledger, and folioed likewise, wherein all receipts of money are entered on the left-hand folio, and payments on the right; specifying in every entry the day of the month, (the year being set on the top,) for what, and for whose account the money was received or paid; and the total debit or credit of each side is to be posted into the Ledger to the account of cash therein, in one line on either side, viz. *To*, or by sundry accounts, as *per* Cash-book, folio, &c. which is to be done once a month, or at discretion; and the particulars of each side, article by article, are to be posted into the Ledger to the proper accounts, unto which they belong, with references in the Cash-book to the several folios in the Ledger; and carry the balance over leaf into the Cash book; - by which you may know at any time what cash you have or ought to have, by you

Another book is a book of Charges of Merchandize, wherein is to be entered the custom and petty charges of any goods shipped, as portorage, wharfage, warehouse room, &c. which once a month is transferred unto the Cash book on the credit side, making references to the book of charges of merchandize, and likewise the same in the debtor side of the same account in the Ledger for the amount thereof.

The next book I shall name is the Invoice book, or book of factories. In this book is to be copied all invoices of goods shipped, either for account's proper or portable: and also of goods received from abroad, which must always be

entered on the left side, leaving the right side blank: and on the advice of the disposal of goods sent abroad, and also on the sale of goods received from abroad, enter them on the blank, or right side: so at first view may be seen how the account stands, &c.

The next is a bill Book, wherein are entered bills of exchange accepted; and when they become due and when paid, they should be marked so in the margin.

The next is a book of Houseshold Expences, for the monthly charge spent in house keeping; likewise apparel, house rent, servants wages, and pocket expences: and this may be monthly summed up, and carried to the credit of cash. Besides those above mentioned, there must be a book to copy all letters sent abroad, or beyond the seas; wherein the name of the person or persons, to whom the letter is sent must be written pretty full, for the reader finding the same.

The next, (and what is very necessary); a Receipt book, wherein are given receipts for money paid, and expressed for whose account or use, or for what it is received; to which the receiving person must set his name for himself, or some other, with the year and day of the month on the top.

Lastly, A Note or Memorandum book, to minute down affairs that occur, for the better help of memory; and is of great use where there is a multiplicity of business.

Having given an account of the several books, and their use, the next thing necessary will be to give some few rules of aid, to enable the book-keeper to make proper entries, and to distinguish the several debtors and creditors, viz.

First, for money received, make Cash Dr. to the party that paid it, if for his own account) and the party Cr.

Secondly, Money paid, make the receiver Dr. (if for his own account,) and Cash Cr.

Thirdly, Goods bought for ready money, make the goods Dr. to Cash and Cash Cr. by the goods.

Fourthly, Goods sold for ready money, just the contrary i. e. Cash Dr. and the Goods Cr.

Fifthly, Goods bought at time; goods bought are Dr. to the seller of them, and the seller Cr. by the goods.

Sixthly, Goods sold for time just the contrary i. e. the party that bought them is Dr. to the goods, and the goods Cr. by the party.

Seventhly, Goods bought, part for ready money, and the rest for time; first make the goods Dr. to the party for the whole; secondly, make the party Dr. to Cash, for the money paid him in part of those goods.



Eightly, Goods sold, part for ready money, and the rest for time; first make the party Dr. to the goods for the whole; secondly, Cash Dr. to the party received of him in part of those goods—Or either of these two last rules may be made Dr. to sundries; as goods bought Dr. to the selling man, for so much as is left unpaid, and to cash for so much paid in ready money; and so, on the contrary, for goods sold.

Ninthly, When you pay money before it is due, and are to have discount allowed you, make the person Dr. to Cash for so much as you pay him, and to Profit and Loss for the discount: or make the receiving man Dr. to sundries as before.

*Profit and loss is Dr.*

To Cash for what money you pay, and have nothing for it, as discount of money you received before due, and for abatement by composition, house-hold expences, &c.

*Per Contra, Cr.*

By cash for all you receive, and deliver nothing for it, as discount for a prompt payment and legacy left you; money received with an apprentice, and by the profit of every particular commodity you dealing, by ships in company, by voyages &c.

*To balance or clear an Account when full written*

**F**IRST, if the Dr. side be more than the credit, make the old account Cr. by the new; and if the contrary, makes the new account Dr. to the old; but if the Dr. side be less than the credit, then make the old account Dr. to the new, and the new account Cr. by the old, or such a rest or sum as you shall find in the account.

2 An account of Company, wherein you have placed more received of another than his stock; then add as much on the debit side as you find on the credit; to the end that, in the new accounts, you may have so much debit as you put in, and so much credit as you have received.

3 In accounts of merchandise, you must enter the gain or loss before you make the old account Cr. by the new, and the new Dr. to the old for the remainder of goods unsold.

4 In the foreign accounts, which you are to keep with a double column, for the dollars, crowns, or other foreign coins, as well as there value in *l. s. d.* which have been received or paid by bills of exchange, for goods sold by factors or correspondents

respondents, or bought by them for the accounts before; here you must first balance the said inward column of dollars, crowns, &c.

*To remove an Account full written to another folio.*

SUM or add up the Dr. and Cr. sides, and see the difference, which place to its opposite: as admit the Cr. side exceeds the Dr. then you are to write the line in the old account to balance on the Dr. side, to answer the line on the Cr. side of the new account.

*How to balance at the Year's end, and thereby to know the state of your affairs and circumstances.*

You must make an account of balance on the next void leaf or folio of your Ledger to your other accounts; but after so done, do not venture to draw out the account of balance in the said folio, till you have made it exact on a sheet of paper, ruled and titled for that purpose; because of mistakes or errors that may occur or happen in the course of balancing your Ledger, which are to be rectified, and will cause erasements or alterations in that account, which ought to be very fair and exact; and after you have made it to bear in the said sheet, copy fair the said account of balance in the Ledger.

The rules for balancing are these, viz.

1st, Even your account of cash, and bear the nett rest to balance Dr.

2dly, Cast up all your goods bought, and those sold of what kind soever, in each account of goods, and see whether all goods bought be sold or not: and if any remain unsold value them as they cost you, or according to the present market price, ready money, and bear the nett rest to balance Dr.

3dly, See what your goods or wares severally cost, and also how much they were sold for, and bear the nett gain or loss to the account of profit and loss.

4thly, Even all the persons accounts with your Drs. and yours Crs. in order as they lie, and bear the nett rest of them severally to balance.

5thly, Even your voyages, your factor's accounts, wherein is either gain or loss, and bear the nett gain or loss to the account of profit and loss; and the goods unsold to balance.

6thly, Even the account of profit and loss, and bear the nett rest to stock or capital, as an advance to your stock or capital.

7thly,

7thly, Even your stock, and bear the nett rest to balance Cr.

Then cast up the Dr. and Cr. sides of your balance; and if they come both alike, then are your accounts well kept; otherwise you must find out your error by pricking over your Book again, to see whether you have entered every Dr. and Cr. in the Ledger as you ought.

Note, By pricking over the book, is meant an examining every article in the Journal, against the ledger, and marking it thus \*, or thus †; and upon the second examination, thus ‡; and upon a third examination, thus ||, or any other mark.

Note also, In all accounts of goods, you must keep a column in the middle of the leaf of each side, for number weight, and measure.

Though all that hath been said in relation to book-keeping, and the several rules thereunto belonging, may seem a little abstruse to the altogether unlearned therein, yet there is no such mighty difficulty to instruct them as they may imagine; for these following hints may render what hath been already said intelligible to an ordinary capacity.

1st, Stick close to the text, or general rule before mentioned, viz. That all things received, or the receiver, are debtors to all things delivered, or the deliverer: for this rule holds good in all cases,

2dly, When the Dr. (whether person or goods) is known, the Cr. is easily understood, without mentioning it; for if A be Dr. to B, then B is Cr. by A, for what sum soever it be; also if goods be Dr. to C, then C is Cr. by those goods for the sum they amount to.—This I mention, because that most Authors (if not all that I have met with on the subject of book-keeping) spend a great many words which I think (begging their pardon if I err) might be saved in declaring the creditor, as well as shewing the debtor, when it may be understood as aforesaid.

3dly, This art of Italian book-keeping, is called Book-keeping by double entry, because there must be two entries; the first being a charging of a person of money, or goods; and the second a discharging of a person, money, or goods.

4thly, Strictly note, That if the first entry be on the Dr. to the left hand side of your Ledger; the next or second entry must always be made on the right or credit side of your Ledger; for whenever one person or thing is charged, then always another person or thing is discharged for the said sum let it be what it will.

And

And so it is in balancing or evening an account, and carrying it to another folio; for, if the old account be evened by the balance on the credit side, then the new account must be debted or charged on the debit side, for the sum that balanced the old account.

Much more out to be said on this art of book-keeping if I had room; but I have plainly spoke to the principal fundamentals thereof, which I hope may be sufficient for the instruction and improvement of any intelligent reader.

The next matter I shall go upon, is to shew, or give examples of various kinds of receipts, and promissary notes; also bills of parcels in different trades; likewise bills of book-debits, bills of exchange, with remarks on them; and some other precedents of writings in trade and mercantile affairs.

*And first, of Receipts of different forms.*

**R**ECEIVED, September 24. 1793 of } *l. s. d.*  
Mr Anthony Archer, the sum of six } 6 09 00  
pounds nine shillings; I say, received for  
my master Brian Berry *per me*

Caleb Catchmoney.

*London, Sept. 24. 1793.*

**R**ECEIVED of Mr Kendrick Keep- } *l. s. d.*  
touch, ten pounds eleven shillings and six- } 10 11 06  
pence; in full payment, *per me*

Henry Hasty.

Note, The sum received must always be expressed in words at length, and not in figures, in the body of the receipt: but it may and ought to be expressed in figures behind a brace, (as in the two foregoing examples), or else between two lines on the left hand of the name at the bottom of the receipt, (as is shewn in the promissary notes in p. 172), as well as in the body of the receipt.

When a receipt is given in a book, there is no occasion to mention the man's name of whom you receive the money, because that is implied, he being the owner of the book

*A Receipt in part of Goods sold.*

**R**ECEIVED, September 24, 1793, of } *l. s. d.*  
Mr Timothy Trustlittles, fifty pounds in } 50 00 00  
part of Indigo sold him the 22d instant *per*  
*me*

Lawrence Lovemoney.

*A Receipt*



*A Receipt given in a Receipt book*

RECEIVED, September 26. 1793, the  
sum of forty five pounds, by the order and  
for the account of George Greedy, per  
Timothy Trufty.

l s d.  
45 00

RECEIVED, September 27. 1793, of Mr  
Daniel Davenport and company, one hundred  
pounds, an account of self and partner, per  
James Jenks.

100 00 00

RECEIVED, September 28. 1793, of  
Mr Peter Punctual, fifty five pounds sixteen  
shillings and ninepence, in part of Tobacco  
sold him the 24th of August last past, per  
Fabian Funk.

55 16 09

RECEIVED, September 29. 1793, of the  
honourable East India Company, three hun-  
dred and fifteen pounds ten shillings, per or-  
der and for the account of Peter Pepper per  
Stephen Storax.

315 10 00

RECEIVED, October 2. 1793, of the  
Governor and Company of the Bank of  
England, one thousand six hundred pounds  
ten shillings, for self and company, per  
Leonard Longpurse.

1600 10 00

RECEIVED, October 5. 1793, of the  
Worshipful Company of Grocers, forty nine  
pounds fifteen shillings, in full payment for  
my father Peter Plumb, per me  
Peter Plumb.

49 15 00

RECEIVED, November 9. 1763, of the  
Right Honourable Sir Samuel Fludyer,  
Knt. Lord Mayor of London, the sum of  
sixty pounds for the use of the Worshipful  
Company of Haberdashers, per  
Caleb Careful Clerk,

60 00 00

*A Rent gatherers Receipt.*

RECEIVED, October 14. 1793, of Mr  
Aaron Arable, in money, eighteen pounds,  
and allowed him for land tax five pounds;  
in all twenty five pounds, in full for half  
year's rent due at Michalmas last; I say re-  
ceived for the use of Laurence Letland, Esq.  
by virtue of his letter of attorney, per me  
Robert Renton.

25 00 00

RECEIVED

RECEIVED of Mr Timothy Tenant,  
this 25th day of October, 1793, six pounds  
for a quarter's rent, due at Michalmas last,  
for my master Launcelot Letfarm, *per me*  
Francis Faithful.

6 00 00

RECEIVED, July 14. 793, of Mr Pe-  
ter Bishop, twenty nine pounds six shillings  
in part of a bill of sixty pounds due the 3d  
as October next, to Mr Simon Shuffle, *per*  
Francis Fiddel.

29 06 00

*A Receipt on the back of a Bill of Exchange*

SEPTEMBER 30, 1793, Received the  
full contents of the within mentioned,  
being 500 pieces of eight *per*

500 pes., of 8.

Nathan needy.

*Promissary Notes*

I PROMISE to pay to Mr Timothy Teazer, or order,  
sixty pounds, on the 20th of this instant, September, Wit-  
ness my hand this 15th of September 1793.

Daniel Dilatory.

l. 60 00 00

October 18. 1793.

I PROMISE to pay to the honourable the Directors of  
the South Sea Company, or bearer, on demand, four hundred  
and fifty pounds, for my father James Jones.

Sambrook Jones

l. 450

October 23. 1793.

I PROMISE to pay unto the Governor and Company  
of the bank of England, or order, on demand, two thou-  
sand pounds.

Nahum Neednothing.

l. 2000

October 24. 1793.

I PROMISE to pay to Miles Man and Company, or  
bearer, on demand, seven hundred sixty-six pounds ten shil-  
lings and nine pence, for my master Robert Regular.

Lewis Martin.

l. 766 10 9

October 25. 1793.

I PROMISE to pay to the honourable East India Com-  
pany,

pany, or bearer, upon demand, five hundred pounds, for  
Henry Hudson.

Martin Moneybag.

l. 5000

*October 26. 1793.*

I PROMISE to pay to Mr Christopher Cash, or order,  
three months after date, five pounds, for value received.  
Witness my hand this 26th day of October 1793.

Robert Ruck.

l. 5 00 00

*A Note given by two.*

WE, or either of us, promise to pay to Mr Matthew  
Mistrust, or his order, six pounds sterling on demand,  
for value received. Witness our hands this 27th of Septem-  
ber 1793.

Nathan Needy.

Samuel Surety.

6 00 00

Witness Nicholas Notice.

*A Bill of Debt*

MEMORANDUM, That I William Want, of Lon-  
don, weaver, do owe, and am indebted unto Mr Ti-  
mothy Trust, of Westminster, watchmaker, the sum of twen-  
ty-five pounds six shillings of lawful money of Great Britain :  
which sum I promise to pay to the said Timothy Trust, his  
executors, administrators, or assigns on or before the 10th  
day of December next ensuing. Witness my hand this 22d  
day of October 1793.

Witness, Titus Testis.

William Want.

*Bills of Parcels.*

IT is usual, when goods are sold, for the seller to deliver  
to the buyer, with the goods, a bill of parcels, which is  
a note of their contents and prices, with a total of their va-  
lue cast up, &c. — These bills ought to be handsomely  
writ, and in a methodical order, according to the best and  
customary way of each particular trade.

I shall therefore shew the forms of bills of parcels in some  
trades and professions, with the shortest methods of casting  
up the several articles in each bill.

*A Mercers Bill.*

*London September 29 1793.*

Bought

Bought of Abel Atlas, and Ben Burdett, viz.  
 12 yds  $\frac{1}{2}$  of rich flowered sattin, at 12s. 6d. per yd.  
 8 yds of sprigged tabby, at 6s. 3d. per yd.  
 5 yds  $\frac{1}{4}$  of farrington, at 6s. 8d. per yd.  
 9 yds of mohair, at 4s. 2d. per yd.  
 17 yds  $\frac{1}{2}$  of lutestring, at 3s. 4d. per yd.

1. 16 7 8 $\frac{1}{2}$

Sometimes the money is paid presently, then the receipt is made as follows:

Received the 26th of September 1793, sixteen pounds seven shillings and eight pence, in full of this bill, for my master Abel Atlas and Company, per me

Francis Fairspoken,

*A Woollen Draper's Bill.*

London, Sept. 24. 1793.

Bought of Benjamin Broadcloth, 22d of September 1793.  
 7 yds of fine Spanish Black, at ——— 18 4 per yd.  
 5 yds  $\frac{1}{2}$  of ditto, at ——— 12 4 ditto  
 6  $\frac{1}{4}$  of fine mixed cloth, at ——— 15 9 ditto  
 16 yds  $\frac{1}{2}$  of frize at ——— 3 6 ditto  
 4 yds of drab de bery, at ——— 13 5 ditto  
 5 yds  $\frac{1}{2}$  of superfine Spanish cloth, at 18 10 ditto

*A Linen Draper's Bill.*

September 26, 1793.

Bought of Marmaduke Muslin, viz.

16 ells of dowlas, at 1s. 4d. per ell.  
 4 ells of lockram, at 1s. 3d. per ell.  
 22 ells  $\frac{1}{2}$  of holland, at 3s. 4d. per ell.  
 1 piece of cambrick, at 15s.  
 85 yds  $\frac{1}{2}$  of diaper, at 1s. 10d. per yd.  
 19  $\frac{1}{2}$  yds of damask, at 4s. 3d. per yd.  
 2 pieces of muslin, at 18s. 10d. per piece.

The several articles of these bills are purposely omitted being cast up for the exercise of the traders in the rules of practice, or in those of multiplication of money, before shewn; which indeed is the best method of all, for the ready casting up the articles contained in any bill of parcels whatsoever.

Example



Example.

We will take the last article of the woollen draper's bill, viz. 5 yds, and  $\frac{7}{8}$  at 18s. 10d. per yard.

$$\begin{array}{r}
 5\frac{7}{8} \qquad \qquad \qquad 18-10 \\
 \hline
 1. \ 4-14-2 \qquad \qquad \qquad \hline
 \qquad \qquad \qquad 16-5\frac{1}{4} \qquad \qquad \qquad 8) \ 131-19 \\
 \hline
 \hline
 \text{Facit } 1. \ 5-10-7\frac{1}{4} \qquad \qquad \qquad 16-5\frac{1}{4}
 \end{array}$$

In this example the price is multiplied by the quantity, viz. 5 yards  $\frac{7}{8}$ , according to the rules delivered in Multiplication of money, and the product by 5 is l. 4. 14: 2; then for the  $\frac{7}{8}$  of a yard, I multiply the price of the integer. viz. 18s 10d. by the numerator of the fraction, viz. 7, and divide, by the denominator 8, and the quotient is 16s 5 $\frac{1}{4}$ d. agreeable with the rule spoken to in the doctrine of fractions. Which 16s. 5 $\frac{1}{4}$ d. added to the product of 18s. 10d. multiplied by 5 gives l. 5: 10: 7 $\frac{1}{4}$ , as the operation above.

A Grocer's Bill.

Bought of Robert Raisin and Peter Plumb October 4, 1793, viz.

|                   | C. qrs, lb. | l. | s.   | d.       |
|-------------------|-------------|----|------|----------|
| Sugar 2 hhds. qt. | 17 2 17     | at | 1 10 | 6 per C. |
| Raisins 3 barrels | 6 1 19      | at | 1 14 | 5        |
| Tobacco 1 hhd.    | 4 0 12      | at | 4 19 | 4        |
| Rice 1 barrel     | 10 0 15     | at | 2 16 | 4        |
| Pepper 1 bag      | 1 3 19      | at | 2 12 | 4        |
| Brimstone         | 2 1 19      | at | 1 19 | 4        |

A Hosier's Bill.

Bought of Sylvester Slipstocking, October 4 1793, viz.

|                                         |         |
|-----------------------------------------|---------|
| 5 pair of womens mixed worsted hose, at | 5s. 7d. |
| 3 pair of womens silk hose, at          | 9 4     |
| 22 pair of mens woollen ditto, at       | 3 2     |
| 8 pair of womens ditto, at              | 2 2     |
| 21 yards of flannel, at                 | 1 11    |
| 8 pair of thread hose, at               | 3 4     |

A Fishmonger's Bill.

Bought of Leonard Ling, October 6. 1793.

|                                               |                 |
|-----------------------------------------------|-----------------|
| 3 C. of haberdine, at                         | 1 7 18 6 per C. |
| 1 C. $\frac{1}{2}$ of ling, at                | 8 12 6          |
| 1 C. $\frac{1}{4}$ of stock fish, at          | 4 10 6          |
| 6 barrels $\frac{1}{2}$ of white herrings, at | 3 10 2          |
| 1 barrel of red herrings, at                  | 2 12 6          |
| 55 dried salmon, at                           | 0 10 2          |

Notes Of haberdine or ling. 104 is a hundred: of stock fish.

fish and herring, 120 to the hundred, 1200 to a thousand, and 12 barrels to a last.

*A Leatherseller's Bill.*

Bought of Henry Hide, October 7. 1793, viz.

|                               | s.    | d.           |
|-------------------------------|-------|--------------|
| 15 large oiled lamb-skins, at | 1     | 3½ per skin, |
| 13 kipp of goat-skins, at     | 3     | 4            |
| 137 alumm'd sheep-skins, at   |       | 3            |
| 10 calves-skins, at           | 4     | 3            |
| 85 oiled buck-skins, at       | 12    | 9            |
| 18 Russia hides, at           | 12    | 9            |
| 60 dicker of hides, at        | l. 15 | 11 6         |

Note. 33 goat-skins make a kipp; and other skins are five-score to the hundred. A dicker is 10 hides or skins, and 20 dickers a last.

*A Pewterer's Bill.*

Bought of Anthony Antimony, October 7. 1793, viz.

|                                                 | l. | s. | d. |
|-------------------------------------------------|----|----|----|
| 9 hard metal dishes. wt. 43 lb. at 14d. per lb. | 2  | 9  | 8  |
| 1 dozen of ditto plates                         | 0  | 17 | 0  |
| 1 chamber pot of ditto                          | 0  | 4  | 0  |
| 1 standish of ditto                             | 0  | 4  | 0  |
| 2 tankards of ditto                             | 0  | 5  | 10 |
| 8 best spoons                                   | 0  | 4  | 6  |
| 3 hard metal poringers                          | 0  | 3  | 8  |
| 1 salt of ditto                                 | 0  | 1  | 10 |
| 1 set of castors                                | 0  | 10 | 0  |

14 19 3

*Bills on Book debts.**A Woollen Draper's Bill.*

Mr Francis Frize, Dr.

|           | s.                              | d.           |
|-----------|---------------------------------|--------------|
| 1793.     |                                 |              |
| April 20. | To 16½ yards of black cloth,    |              |
|           | at                              | 18 3 per yd. |
| May 4.    | To 13½ yds of drab de-berry,    |              |
| 24        | at                              | 15 6         |
|           | To 35 yds of mixed gray cloth,  |              |
| June 2.   | at                              | 10 5         |
| 12.       | To 9 yds of fine ditto, at      | 17 3         |
|           | To 12½ yds of fine broad cloth, |              |
|           | at                              | 17 3         |

If the gentleman pays the whole bill, then make the receipt thus;

Received the 19th of October 1793, of Mr Francis Frize, the sum of fifty-four pounds &c, in full of this bill, and of all accounts, for my master David Draper.

l. 54. &c.

per Michael Measurewell.

*A Mercer's Bill.*

1793, Madam Dinah Dilatory, Dr. to Bryan Brocade, viz.

|           | yds.                             | s. | d.      |
|-----------|----------------------------------|----|---------|
| March 6.  | To 16½ of flowered sattin, at 14 | 9  | per yd. |
| April 14. | To 14 of Venetian silk, at 11    | 8  |         |
| Ditto 16. | To 99 of Mohair, at 6            | 3  |         |
| May 16.   | To 14½ of flowered damask, at 9  | 7  |         |
| June 7.   | To 5½ of Genoa velvit, at 21     | 6  |         |
| Ditto 25. | To ½ of Lutestring, at 4         | 7  |         |

If part of the bill is paid, write thus;

Received of Madam Dinah Dilatory, twelve pounds ten shillings, in part of payment for my master Bryan Brocade.

per Henry Hunter.

*A Corn Candler's Bill.*

1793. Mr Robert Racer, Dr. to Lionel Livery.

|           |                              | s. | d.        |
|-----------|------------------------------|----|-----------|
| April 24. | To 5 quarters of oats, at 2  | 3  | per bush. |
| May 16.   | To 9 bushels of beans, at 4  | 10 |           |
| June 12.  | To 7 bushels of bran, at 1   | 10 |           |
|           | To 19 bushels of oats, at 1  | 11 |           |
| Ditto 25. | To 16 bushels of beans, at 3 | 11 |           |

*A Tobacconist's Bill.*

1794. Mr Fume, Dr to Rich. Raisedcloud, viz.

|           |                                               | d.          |
|-----------|-----------------------------------------------|-------------|
| May 1.    | To 1 hhd. of tobacco qt. nett, 562 lb. at     | 10½ per lb. |
| Ditto 25. | To 1 box qt 75½ lb. nett, at                  | 11½         |
| June 5.   | To 5 bags of old Spanish, qt, nett 671 lb, at | 3½          |
| July 12.  | To ½ hhd. 334 gross, tare 42, nett 293 lb. at | 5½          |
| Sept. 7.  | To 2 rolls of tobac. qt. 94 lb, at            | 9½          |

*A Stationer's Bill.*

|           |                                              |    |          |
|-----------|----------------------------------------------|----|----------|
| 1793.     | Mr Siserah Scribbler, Dr to Phineas Foolscap |    |          |
|           | viz. Reams                                   | s. | d.       |
| July 1.   | To 57 of demy paper, at                      | 10 | 9 per R. |
| Ditto 30. | To 195 of 2d foolscap, at                    | 6  | 3        |
| Aug. 24.  | To 375 of 2d demy, at                        | 8  | 2        |
| Sept. 6.  | To 95 French Royal, at                       | 12 | 6        |
| Oct. 26.  | To 27 rolls of parchment,                    | 15 | 11       |

Note, A roll of parchment is 60 skins; a ream of paper 20 quires; and a bale of paper 10 reams.

*A Bricklayer's Bill.*

|           |                                                 |  |  |
|-----------|-------------------------------------------------|--|--|
| 1793.     | Mr Martin Messuage, Dr to Peter Pantiles, viz.  |  |  |
| March 27. | To 25 thousand bricks, at 16s. per M.           |  |  |
| Ditto 30. | To 11 thousand plain tiles, at 20s. 6d. per M.  |  |  |
| April 1.  | To 28 C. of lime, at 12s. per C.                |  |  |
| Ditto 30. | To 20 loads of sand, at 3s. 6d. per load.       |  |  |
| May 20.   | To 140 ridge tiles, at 8s. 6d. per C.           |  |  |
| June 24.  | To 90 days work myself, at 3s. per day.         |  |  |
|           | To 90 days, my man, at 2s. 6d.                  |  |  |
|           | To 90 days another bricklayer, at 2s. 6d.       |  |  |
|           | To 20 days for 2 labourers, at 20d. a day each. |  |  |

Note, 1000 plain tiles is 1 load; and 25 bags or Bushels of lime is 1 C. A brick must be 9 inches long, and  $4\frac{1}{2}$  inches broad. Bricks are of three sorts, plain bricks, red and gray stock bricks.

Here it will be convenient to give a general rule for the casting up any thing sold by the thousand, as bricks, tiles, clinkards, or Flander's paving bricks, and several other things mentioned in the book of rates, viz. barrel hoops, goose-quils, oranges and lemons, squirrel skins, billets, &c.

*And the easy Rule is this, viz.*

Multiply the given number by the shillings in the price, (if the price be at so many shillings per M). and always cut off three figures or places towards the right hand: and the figures towards the left hand are shillings, which divide by 20, to bring them into pounds: and those figures separated towards the right hand multiply by 12, the next inferior denomination: and still cut off, or separate three places towards the right hand, and the figures towards the left are pence; and the three last figures cut off multiply by 4; and still separate three figures towards the right hand, and the figure towards



towards the left are farthings. And if the price be shillings and pence, or shillings, pence, and farthings per thousand, then multiply by these shillings as before, and take parts for the pence and farthings, as in the rule of practice; add these together, and proceed as above directed.

Example.

$$\begin{array}{r} 24650 \\ 170 \\ \hline 172550 \\ 24650 \\ \hline \end{array}$$

$$419 \mid 950 \text{ Ans. } 419 \text{ s. } 11 \text{ d. or } 20 \text{ l. } 19 \text{ s. } 0 \text{ d.}$$

$$\begin{array}{r} 0 \mid 600 \\ 4 \\ \hline 2 \mid 400 \end{array}$$

Example 2.

$$6d - \frac{1}{2} \quad 261324 \text{ plain tiles, at } 20 \text{ s. } 6d. \text{ per thousand.}$$

$$\begin{array}{r} 1567244 \\ 261324 \text{ Ans. } 4311 \text{ s. } 10 \text{ d. } 608 \text{ f.} \\ 130662 \text{ or } 215 \text{ l. } 11 \text{ s. } 30d. \end{array}$$

$$4311 \mid 846$$

$$10 \mid 152$$

$$608$$

When things are sold by the hundred, as Dutch and English pantries then follow this rule, viz.

Multiply the given quantity by the shillings in the price, and take parts for the pence and farthings (if any) as before; then from the right hand of the sum cut off two places, and proceed as in the last rule.

Example.

Example.

1726 pantiles, at 7s. per C.

$$\begin{array}{r} 7 \\ \hline 120 \overline{) 82} \\ 12 \\ \hline 9 \overline{) 84} \\ 4 \\ \hline 3 \overline{) 36} \end{array}$$

Ans. 120s. 9 $\frac{1}{2}$  or 6l. os. 9 $\frac{1}{2}$ d. and  $\frac{1}{16}$ s.  
of a farthing.

Example 2.

6d —  $\frac{1}{2}$  2964 stock bricks, at 2s. 6d. per C.

$$\begin{array}{r} 2 \\ \hline 5928 \\ 1482 \overline{) 10} \\ 74 \overline{) 10} \\ 12 \\ \hline 1 \overline{) 20} \\ 4 \\ \hline 80 \end{array}$$

Ans. 74s. 1d.  $\frac{1}{10}$ s. or 3l. 4s. 1482 id.

On Bills of Exchange.

**B**ILLS of Exchange are either inland or foreign; the inland bills are drawn by one trader in one city or town, upon another of another city or town in the same kingdom; as London upon Bristol, or Exeter upon London, &c. and these chiefly concern our shop-keepers, and wholesale traders either of town or country; and the foreign more immediately concern the merchant.

Bills of Exchange, if handsomely drawn, must be written in a fair hand, on a long piece of paper, about three inches broad, and writ in form after the following precedents.

a Bill

A

*A Bill payable at Sight.*

*London, 5th October, 1793.*

**A**T sight hereof, pay to Mr George Greedy, or his order, the sum of fifty pounds for value received of Christopher Cash, and place it to account, as per advice from, To Mr Peter Punctual

Grocer in Highstreet,  
Bristol.

Your humble servant,  
Danial Drawbill.

Note, A bill at sight is payable three days after the acceptor seeth it.

*Exon. November 14. 1793.*

**S**EVEN days after sight hereof, pay to Mr Naman Needy, or his order, twenty-four pounds ten shillings, for the value received here of Mr Timothy Transfer, and place it to account as per advice from,

To Mr Simon Certain,  
haberdasher in Milk-  
street, London.

Your friend and servant,  
Michael Money.

If Mr Needy sends his servant, Andrew Benson to receive the money; after he hath writ his name on the back of the bill, (which is his order,) the servant must write a receipt to his master's name, thus.

**R**ECEIVED, November 16th, 1793, the full contents of the within mentioned bill, being twenty-four pounds ten shillings.

Witness

Nathan Needy.

Andrew Benson.

*A Foreign Bill of Exchange.*

*London October 6. 1793, for 460 crowns at  
56d.  $\frac{3}{4}$  sterling per crown.*

**A**T usance pay this my first bill of exchange, (my second or third not being paid) unto Mr Henry Vernon, or order, four hundred and sixty crowns, at 56d.  $\frac{3}{4}$  per crown, for the value received of Mr Samuel Thompson, and pass it to account, as per advice from Sir,

To Mr Will. Walker,  
merchant at Paris.

Your humble servant,  
Ebenezer Reynolds.

*Another:*

*London, 17th October 1793, for 480 dollars at,  
55d.  $\frac{1}{4}$  per dollar.*

**A**T three usance pay this my first bill of exchange unto Mr William Wealthy, or order, four hundred and eighty

eighty dollars, at 53d.  $\frac{1}{4}$  sterling per dollar; for the value received of himself, and place it to account, as per advice from

To Mess Daniel and

Davie Bernardiston,  
merchants in Aleppo,

Your humble servant,

Mark Mercator.

Note, Usance between England and France or Holland, is one calendar month; between England and Spain or Portugal, two months; between England and Italy, three months, &c.

*Once more.*

*Bristol, 14th May, 1793, for 600 Pieces of Eight at 53d.  $\frac{1}{4}$  per Piece.*

**A**T double Usance pay this my first Bill of Exchange unto Mr Laurence de Luz or his order, six hundred pieces of eight, Mexico, at 53d.  $\frac{1}{4}$  Sterling, per piece of eight, for value received of Gomez Henriques, and pass it to Account as per advice from yours,

To Mr Simon Surepay,

William Henry Hern,

Merchant in Leghorn.

*Notes on Bills of Exchange.*

1. **T**HE acceptor of any bill is become absolute debtor to the person to whom the bill is payable for the contents thereof.

2. The person to whom the bill is payable must demand the money the very day it becomes due, and if the acceptor die before it becomes due, it must be demanded of the executor or administrator.

3. The drawer of any bill must always give his correspondent a letter of advice, that he hath drawn such a bill on him for such a sum, &c.

4. None may pay a bill without such a letter of advice.

5. In England a bill is due the third day after the expiration of the time mentioned in the bill.

*Of Indorsing.*

**I**T frequently happens, that between the acceptance of a bill, and the time of payment, the party to whom it is first made payable hath occasion to pay it away; if so, he writes his name on the back of the bill, which is his order, (as said before) and gives it to the person he is indebted to, and then he is impowered to receive the money: And it may be the second person also wants to pay it away; and then he writes his name likewise under the other, and delivers it to a third person to receive the money: And it may be the third does the same, and delivers it to a fourth person, &c. All that



that do so, are indorsors; and he that last hath the bill, if the acceptor will not pay it, may sue him, or the indorsers, or drawer, or any one of them, for the money.

An indorsement is generally in these words, viz. pay the contents of the within mentioned bill to Henry Hasty.

George Greedy.

But generally the name only is accounted sufficient.

*Of Protesting.*

**W**HEN a bill is to be protested, the par'y that hath the bill must go to a public notary, (not a common Scrivener) whose business it is; and he goes with you to the acceptor's house, and demands payment, &c. and then he draws up a protest according to law; which is to be returned to the drawer within the time limited, &c.

It is needless to give here the form of a protest, because no man can do it of himself.

*A Bill of Debt.*

**K**NOW all men by these presents, That I Lawrence Lackcash of Southwark, vinter, do owe and am indebted unto Charles Creditman, of the same place, Salter the sum of one hundred and fifty pounds of lawful money of Great Britain; which said sum I promise to pay unto the said Charles Creditman, his executors, administrators, or assigns, on or before the 4th of July next ensuing the date hereof. Witness my hand and seal this 13th day of May, 1733.

Sealed and delivered

in the presence of

Lawrence Lackcash;

*A Bill of Money borrowed.*

**R**ECEIVED and borrowed of Oliver Overcast, of London, Merchant, fifty pounds, which I do hereby promise to pay on demand. Witness my hand this 13th day of May,

1733.

Peter Penury.

*The Charge of Noting and protesting a Bill.*

|        |   |                  |     |  |      |   |         |         |
|--------|---|------------------|-----|--|------|---|---------|---------|
| Noting | { | within the city  | 1 6 |  | Pro- | { | within  | 3 0     |
|        |   | without the city | 2 6 |  |      |   | testing | without |

*The form of a Bill of Lading.*

**S**HIPPED by the Grace of God, in good order and well conditioned, by Edward Export of London, Merchant, in and upon the good Ship called (the) Bilbao Merchant

Merchant of London) whereof is Master under God for this present voyage (Martin Mizen of London, Mariner) and now riding at anchor in (the port of London) and by God's grace bound for (Cadiz) to say (1 bale of TB stocking baize, and 1 trunk containing five hundred pair No of silk-stockings, contents, &c, as per Invoice) being (1,2. marked and numbered as per margin, and are to be delivered in the like good order at the aforesaid port of (Cadiz) and the dangers of the seas only excepted, unto (Mr Thomas Drake, Merchant there) or to his assigns he or they paying freight for the said goods (three pieces of eight per Cwt.) with priimage and average accustomed. In witness whereof the master or purser of the said ship hath affirmed to (three) bills of lading, all of this tenor and date, one of which (three) bills being accomplished, the other (two) to stand void. And so God send the good ship to her desired port in safety.

Dated in London the 6th of October, 1793. insides and contents unknown to Martin Mizen.

Note The several words included in the parenthesis, are to be put into the several vacant places that are in a blank bill of lading.

Note also, Average is, the general allowance made to the master of the ship, of 1d. or 2d. in every shilling freight Primage, a small allowance to be distributed among the Sailors.

*The Form of an Invoice.*

*Fort Royal in Jamaica, July 24. Anno. 1793.*

**I**NVOICE of five barrels of indi o, five hhds. of sugar, and five hhds. of pimento, shipped on board the George of London, George Jones, commander, for account and risque of Messrs John and Thomas Fisher, of London, Merchants, being marked and numbered as per margin: contents, costs, and charges, as in the following examples.

viz

A  
qt. 3  
holla  
Samu  
of Lo

*The Young Man's best Companion.*

177

viz. Indigo 5 B.

|     |         |
|-----|---------|
| I F | 143 lb. |
| No  | 143     |
| 121 | 146     |
| to  | 152     |
| 125 | 172     |

756lb. nett, at 2s. 2d. per lb.

| l. | s. | d. |
|----|----|----|
| 81 | 18 | —  |

Sugar 5  
Hhds.

Tare

| No  | C. qrs. lb. | C. qrs. lb. | C. qrs. lb.    |
|-----|-------------|-------------|----------------|
| 126 | 11 3 27     | 1 2 19      | Gross 68 0 00  |
| to  | 12 2 19     | 1 3 00      | Tare 8 3 12    |
| 130 | 13 2 13     | 1 2 16      |                |
|     | 14 2 15     | 1 3 11      | Nett 59 0 16   |
|     | 5 1 10      | 1 3 22      | at 24s. per C. |

70 19 5

68 0 00

8 3 12

Pimento

lb.

5 Hhds.

Tare

2026 Gross.

lb.

lb.

389 Tare.

432

84

396

72

Nett 1637 at 11½d. per lb.

410

81

376

70

Charges.

412

82

To cost of 5 Barrels and 10

2026

389

Hhds.

l. 47 9

To Storage

100

78 — 9½

5 7 9

To Commission at 5 per C.

Errors excepted, per A. B.

230 15 11½

11 16 8½

*An account of Sales.*

*Port Royal in Jamaica, July 25. 1793.*

**A**CCOUNT of the sale of 2765 ells of brown ozenburgs, 1112 yards of blue hartford, 2 peices of gray cloth, qt. 39 yards, 50 pair of fine worsted hose, and 175 ells of bag holland, received from on board the ship Good Success, Capt. Samuel Sharp, Commander, for account of Lawrence Lucky, of London, Merchant is Dr.

P

To

|                                     |       |    |                  |    |    |                 |
|-------------------------------------|-------|----|------------------|----|----|-----------------|
| To portage of ditto                 | 1. 00 | 17 | 06               | l. | s. | d.              |
| To commission of sales,             | 13    | 01 | 11               |    |    |                 |
| To storage, at $\frac{1}{2}$ per C. | 06    | 10 | 11 $\frac{1}{2}$ |    |    |                 |
|                                     |       |    |                  | 20 | 0  | 4 $\frac{1}{2}$ |

To the nett product carried to the credit of  
account, bad debts excepted,

246 6 4 $\frac{1}{2}$   
266 6 9

*Per Contra, Cr.*

By 2765 brown ozenburgs, making 3456 $\frac{1}{2}$  yds.  
at 8 $\frac{1}{2}$ d. per yard, sold Ambique Baker.

22 8 2

By 1112 yds. of blue linen, sold at 7 $\frac{1}{2}$ d. per yd.

35 8 2

By James Smart, for 39 yards of cloth, at 15s.  
per yard.

29 5 0

By Lawrence Monk, for 50 pair of hose, at 7s.  
10d. per pair,

19 1 8

By ditto, for 175 ells of bag holland, at 6s.  
3d. per ell.

54 13 9

291 16 9

Errors excepted. July 24 1793. per

Charles Careful

*Business at the Water-side, concerning Exporting and Importing of Goods, &c. entering them at the Custom-house, &c.*

**W**HEN there are goods to export, and ready packed &c. there must first be made a bill of entry (as it is called) for the contents after this form, viz.

In the Loyal Merchant, William Worm, for Barbadoes,  
Edwin Export.

Three cases of haberdashery,

Five tons of beer, &c.

Of these bills there must be seven, one of which must be in words at length, and the other may be expressed in figures. These are, by the clerks of the custom-house, entered into several books for that purpose.—If some goods pay custom, and others not, then there must be made two entries; one for those that pay custom, and another for those that pay not, and likewise you must have two cockets.

A cocket testifies the payment of all duties, and is written on a small piece of parchment, in the following words:

Know ye that Edwin Export, merchant, for three cases of haberdashery, and five tons of beer, in the Loyal Merchant

**T**  
capt  
thes  
try i

**T**  
ward  
well  
warr  
whos  
marg  
stom  
rant f  
Wh  
goods  
broad  
of En  
after i  
part of  
(prod  
paid th  
draw



chant, William Worm, for Barbadoes, hath paid all duties.  
Dated 9th November, 1793.

On the back side of the cocket you must set down the marks, numbers, and quantity of the goods expressed in the inside.—When on clean paper you transcribe your bill of entry upon which a shipping bill will be made out, on the back of which, signify the marks, numbers, and contents, as before on the cocket; both which being thus indorsed, you are to deliver them to the searcher, at the water side, who deposits them in the office till the going away of the ship, and then they are delivered to the captain or master of the ship.

If you have not judgment or experience enough to enter your goods yourself, it is but applying yourself to any one of the clerks in the long-room, who make it their business (and good business too) to enter peoples goods; and for a shilling (you giving them the contents) they will write your bills, and pass your entries, without giving you any farther trouble, or your running any risk of making any false entries, &c.

*Entry Inwards.*

**T**HE ship being arrived, search the entry book in the long room, and you will find the name of the ship and captain, and also the waiters that are to attend the delivery of the ship, and at what key the goods will be landed. The entry inwards runs thus:

*In the Mercury John Keelhaul, from Antigua.*

25 hhd. of sugar, &c.

50 bags of cotton, &c.

There must be eight of these bills (though but seven outwards) and one of these must be in words at length, (as well as one of the seven bills outwards) which is for the warrant of delivery; and must be signed by the person in whose name the goods are entered; and the mark also in the margin; which being done, and the fee for entry and custom paid, you will then have from the land-waiters a warrant for the landing and receiving your goods.

When goods are to be exported by certificate, viz. foreign goods formerly imported; these goods being to be sent abroad, or exported to another place or country by a native of England, within twelve, or a stranger within nine months after importation, entitles the exporter to a draw-back of part of the custom paid at the importation of the said goods (producing a certificate from the comptroller, that they have paid the duties inwards. And the debenture or custom draw back runs thus;

*Debenture.*

**C**HRISTOPHER Commerce, natural born, did on, &c. make an entry with us of two thousand ells of broad Germany linen in the Amazon, Capt. Stephen Stout, for Jamaica, the subsidy, &c. was paid inwards by &c. as appears per certificate of collector inwards: and for further manifestation of just dealing therein, he hath also taken oath before us of the same.

Custom house, London, 9th November 1793.

*The Oath.*

Jurat C. C. That two thousand ells of broad Germany linen above mentioned, was really shipped out, and hath not been relanded in any port or creek in England, or Wales since last shipped, Nov. 9. 1793.

*The Certificate cocket.*

London, Know ye that C. C. for two thousand ells of broad Germany linen, paid, per, &c. the day, &c. last, late unloaded, and now in the Amazon, Stephen Stout, for Jamaica. Dated the 9th of November 1793.

This certificate cocket is gained by applying to the books of the importer to know, the day &c. when the custom inward was paid, and by whom; which carry to the long-room in the customhouse, and deliver it to the comp'rroller's clerk of the subsidy inward and outward, with an account of what you would export, &c.

A little before was mentioned at what key the goods should be landed, and therefore here it is proper to name the keys (or rather quays) and wharfs that goods are usually landed at; which are these, viz.

Somer's key, Smart's key, Wiggen's key, Bear key, Dice key, Customhouse key, Potter's key, Wool key, Galley's key, Brewer's key, Ralph's key, Chester's key, Lyon's key, Cox's key, Hammond's, Young's, and Gaunt's keys. And the wharfs are, Fresh wharf, and Botolph wharf.

Besides these there are certain places called dock's, which are harbours cut into the land, where there is no current, but only a flow, and an ebb, occasioned by the rise and fall of the tide in the river Thames: and these are convenient for the laying of vessels, hoys, lighters, barges and boats, and are these, viz.

Billingsgate dock, Stabb's dock, Tower dock, St Catharine's dock, Wapping dock, Hermitage dock, Execution dock,

dock, and Limehouse dock. And above bridge, Queen-hith dock, Puddle dock, Whitefriar's dock, and Scotland-yard dock. And on Southwark, or Surry side, are Saviour's dock, Clink dock, and Savery's dock, below the Bridge-yard, and several others for private uses.—But more particularly eminently on that side of the water, is the Bridge-yard, for landing sundry sorts of merchandises, but chiefly from the ports of England.

*Of Wharfage and Lighterage.*

**W**HARFINGERS have several managers over them, and also a committee to redress grievances, &c. and clerks of the stations, with lighter managers, and have the letting of many warehouses, (which now are very fine and commodious, being rebuilt since the great fire in Thames street,) cellars, &c. and have the privilege of keeping lighters for the carriage of goods to and from ships.

*The Rates of Wharfage.*

Are generally computed at 12d. per ton, whether outward or inward; excepting sugars from the West Indies, which pay 2s. per ton, 4 hogsheads being accounted a ton (though they weigh more;) crantage is included, in the 12d. per ton wharfage; and for lighterage, the wharfingers have 12d. for 4 hogsheads of sugar that come from the West Indies; and for wine and other goods, the lighterage is half as much as the wharfage.

*Husbands of Ships.*

**W**HERE several persons, are concerned in a ship there is usually a husband chosen by them, to take an account of every merchants goods, &c. and pay the wharfage, lighterage, portorage, &c. and these husbands are to collect every merchant's proportion, when they do the owner's freight.

*Of measurement of planes and solids.*

**T**HE several kinds of measuring are three, viz.

1st. Lineal, by some called running measure, and is taken by a line, which respects length without breadth; the parts of which are,

12 inches 1 foot, 3 feet 1 yard, 16 feet and a half 1 rood, pole, or perch.

All kinds of ornamental work, such as cornice freeze, &c. are measured by running measure.

2dly, Superficial, or square measure, is that which respect length and breath, and the parts are,

144 inches one foot, 72 inches half a foot, 36 inches one quarter of a foot, 18 inches half a quarter of a foot, 272 inches and a quarter one rood, 136 feet half a rood, 1296 inches, or 9 feet, one superficial or square yard.

3dly, Solid, or cube measure which respects length breadth, and depth or thickness; and the parts are,

1728 inches one foot, 1296 inches three quarters of a foot 864 inches half a foot, 432 inches one quarter of a foot, and 27 feet one solid yard.

### *Superficial Measure.*

**T**O measure things that have length and breath, such as boards, glass, pavement, wainscot, and land, is to take the dimensions of the length and breadth according to the customary method used in each particular; for instance, board and glass are measured by the foot, the dimensions are taken in feet and inches, and the content given in feet.

The dimensions of wainscotting, and paving, plastering and painting, are taken in feet and inches, and the content given in yards.

### *Of the square and superficial content or area.*

The squaring of any number, is multiplying it into itself, as 12 inches multiplied by 12 inches make 144 square inches. The superficial content or area of any thing is found four several ways, viz. by whole numbers, by decimals, by practice, and by cross multiplication; in each of which methods I shall give examples of the operation.

A square hath its sides perpendicular and equal.

An oblong hath its sides perpendicular, and those that are opposite equal; but the adjacent sides are unequal; boards, wainscots, ceilings, windows, doors, &c. commonly of this figure.

When any thing is to be measured, it must be considered what form or fashion it is of; and then it must be measured according to the several rules for each figure.

1st. If it be a square or oblong, then the length and breadth must be multiplied one by the other, which gives the content in square measure, and that product must be divided by its proper divisor, according to the name in which the content or area is to be given.

*Example*



Example.

Admit a board be 12 inches broad, and 8 feet, or 96 inches long, how many square or superficial feet doth it contain?

B. 12.



$$\begin{array}{r} 96 \\ 12 \\ \hline 144) 1152 \text{ (8 feet)} \\ 1152 \\ \hline (0) \end{array}$$

Note, The length in inches is multiplied by the breadth in inches, and the product 1152 divided by 144, the square inches in a foot, quotes 8 feet square for the content of the board.

A Rule for Dispatch.

If the length of a board, or piece of glass, be given in feet, and the breadth in inches, multiply one by the other, (without any reduction) and divide by the product 12, and the quotient will be the answer in feet, and the remainder will be parts of a foot. So the forgoing example might have been done sooner by dividing 96 the length by 12, the breadth, and it quotes 8 feet for the content, as by the former way.

Example.

Suppose a board be 14 feet long, and 15 inches broad; what is the content in square feet?

14 Feet long.

15

$$\begin{array}{r} 12) 210 \\ \hline \end{array}$$

Feet.  $17\frac{6}{12}$  or  $\frac{1}{2}$

Or consider thus:

by  $\frac{14}{1-3}$

3 In.  $\frac{1}{4} 3\frac{3}{4}$  or  $\frac{1}{2}$

Ans.  $17\frac{1}{2}$

So the answer is 17 f et. and  $\frac{1}{2}$ . And so for any other example, of this kind.

Here 3 inches is the  $\frac{1}{4}$  of a foot, wherefore  $\frac{1}{4}$  of 14 is taken, and added to 14, and it makes 17 feet and  $\frac{3}{4}$ , equal to  $\frac{1}{2}$ .

Another Example wrought four different ways.

If a board be 12 feet  $\frac{1}{2}$ , or 150 inches long, and 15 inches broad; how many square feet doth it contain?

Vulgarly.

Vulgarly.  
Inches.

$$\begin{array}{r}
 150 \text{ long.} \\
 15 \text{ broad.} \\
 \hline
 750 \\
 150 \\
 \hline
 2250 \\
 144 \overline{) 2250} \text{ (15 Feet.} \\
 \underline{144} \phantom{0} \\
 810 \\
 \underline{720} \\
 \hline
 \text{Rem. } 90
 \end{array}$$

Decimally.

$$\begin{array}{r}
 125 \\
 125 \\
 \hline
 625 \\
 250 \\
 \hline
 125 \\
 \hline
 \text{Feet } 15,625 \\
 \text{Feet } 15,625 \\
 \hline
 12 \\
 \hline
 \text{Inches } 7,500 \\
 \hline
 4 \\
 \hline
 \text{Quarters } 2,000
 \end{array}$$

Multiply by 12 Inch. 1 Foot.

$$\begin{array}{r}
 144 \overline{) 1080} \text{ (7 Inches} \\
 \underline{1008} \\
 \hline
 \text{Rem. } .72
 \end{array}$$

Multiply by 4 the Quarters in an Inch.

$$\begin{array}{r}
 144 \overline{) 288} \text{ (2 Quarters or } \frac{1}{2} \\
 \hline
 \dots
 \end{array}$$

By cross multiplication.

| Feet. | In.            |
|-------|----------------|
| 12    | 6              |
| 1     | 3              |
| <hr/> |                |
| 12    | 0              |
| 0     | 6              |
| 3     | 0              |
| 0     | $1\frac{1}{2}$ |
| <hr/> |                |

Ans. 15  $7\frac{1}{2}$

By Practice.

| Feet.                  | In.            |
|------------------------|----------------|
| 12                     | 6              |
| <hr/>                  |                |
| 12                     | 6              |
| 3 Inches $\frac{1}{4}$ | $1\frac{1}{2}$ |
| <hr/>                  |                |
| 15                     | $7\frac{1}{2}$ |

The four methods here used are as follows ; first, by multiplying the Inches together, and dividing by 144. &c. The second Work is performed decimally ; the third method is by cross multiplication ; and the last and best is by practice Any

Any of these methods may be easily understood by the use of the arithmetical part of this book, except the method by cross multiplication, which I shall explain here.

In the example, 1 foot 3, stands under 12 feet 6; and having drawn a line, say, 12 is 12; then I say cross way, 6 times 1 is 6 inches; so that line is 0 feet 6 inches; then cross-way again, I say 3 times 12 is 36 inches, the 12's in 36 is 3 times, or 3 feet; so that line is 3 feet 0 inches, Lastly, I multiply the inches, together, saying, 3 times 6 is 18, the 12's in 18 once, and there remains 6 or  $\frac{6}{12}$  equal to  $\frac{1}{2}$ , as in the work.

If a board be wider at one end than the other, then take the breadth in the middle, or add the measure of both ends together, and take the half for the mean breath, which multiply by the length.

Example.

Suppose a board to be 120 inches long, and the narrowest end 10 inches wide, the broadest end 34 inches wide; what is its content in superficial feet?

Add } 34 broadest end,  
          } 10 narrowest.

Sum 44  
its half—  
is 22 the medium.  
120 the length.

144) 2640 (18 feet  $\frac{1}{2}$  Ans.

144

1200

1152

Rem. 48 | 4 | 1

— or 4 inches; that is 48 the remainder.

144 | 12 | 3

is  $\frac{1}{3}$  of 144.

Or thus

| Feet. | Inches..            |
|-------|---------------------|
| 10    | 00 the length.      |
| 1     | 10 the mean breath. |

|                |                 |      |
|----------------|-----------------|------|
| In             | 10              | 00   |
| For 10 inch- } | 6 $\frac{1}{2}$ | 5 00 |
|                | 4 $\frac{1}{2}$ | 3 04 |

18 04 Ans.

If

If a board or piece of glass be ever so irregular, it may be measured very near by taking the breadth in 5 or 6 places, and add the several breadths together, dividing the total by the number of places, and the quotient will be the mean breadth; which multiply by the length, &c.

Having the breadth in inches of any board, or piece of glass, will make a foot superficial.

Rule. Divide 144 by the inches in breadth, and the quotient will be the length of that board that will make a foot.

Example.

If a board be 9 inches broad, what length of that board to know how much in length of that board or piece will make a superficial foot?

$$\begin{array}{r} 9 \overline{) 144} \end{array}$$

Answer 16

*Proper Directions for Joiners, Painters, Glaziers, &c.*

Rooms being various in their forms, take this general rule in all cases, viz.

Take a line and apply one end of it to any corner of the room; then measure the room, going into every corner with the line, till you come to the place where you first began; Then see how many feet and inches the string contains, and set it down for the compass or round; then take the height by the same method.

Glaziers are to take the depth and breadth of their work, and multiply one by the other, dividing by 144; glass being measured as board.

Having thus shewn the methods of casting up dimensions, I come now to particulars; and the first of

*Glaziers Work, by the foot*

If the windows be square, multiply the length by the breadth, which will produce the content, as above said.

Example.

By cross multiplication.

$$\begin{array}{r} \text{feet in.} \\ 8 \text{ 9 high.} \\ 7 \text{ 3 broad.} \\ \hline 56 \text{ 0} \\ 2 \text{ 0} \\ 5 \text{ 3} \\ 2 \frac{1}{4} \\ \hline 63 \text{ 5} \frac{1}{4} \end{array}$$

By practice.

$$\begin{array}{r} \text{feet in.} \\ 8 \text{ 9} \\ 7 \text{ feet 3} \\ \hline 61 \text{ 3} \\ 3 \text{ inches } \frac{1}{4} \quad 2 \quad 2 \frac{1}{4} \\ \hline 63 \text{ 5} \frac{1}{4} \text{ Ans.} \end{array}$$

If



If the windows are arched, or have a curved form, no allowance is made, by reason of the extraordinary trouble, and waste of time, expence or waste of glass, &c. And the dimensions taken from the highest part of the arch, down to the bottom of the window, from the height or length; which multiply by the breadth, and the product will be the answer in feet, &c.

Glaziers are often so very nice, as to take their dimensions, and measure a quarter of an inch.

*Example.*

|                                 | feet. | in.                   |
|---------------------------------|-------|-----------------------|
|                                 | 4     | $3\frac{1}{2}$ long.  |
|                                 | 2     | $7\frac{1}{4}$ broad. |
| <hr/>                           |       |                       |
| 6 inches is $\frac{1}{2}$       | 8     | 7                     |
| $1\frac{1}{2}$ is $\frac{3}{4}$ | 2     | $1\frac{3}{4}$        |
| $\frac{1}{4}$ is $\frac{1}{8}$  |       | $6\frac{3}{4}$        |
|                                 |       | $1\frac{1}{8}$        |
| <hr/>                           |       |                       |
|                                 | 11    | $4\frac{1}{4}$        |

Glass is measured by the foot, as said before; and the price of work is as follows; viz.

|                                                     | s. | d. |
|-----------------------------------------------------|----|----|
| English glass per foot                              | 0  | 5  |
| French and crown glass                              | 1  | 0  |
| Common work, leading included for every foot square | 0  | 6  |
| New leading, old glass per foot                     | 0  | 3  |
| Common diamond square each                          | 0  | 1  |

*Painters Work by the Yard.*

**W**HEN the Wainscot of a room is painted, you are to measure round the room with a line, as hinted before, and the height is to be taking by girting a string over all the moldings from the top of the cornice to the floor; then multiply the compass by the height, and you have the content in feet and inches; which may be reduced into square yards, by dividing by 9,

*Example.*

## Example 1.

A room painted.

Feet In.

Being 45 8 in compass } What is the content in square  
 10 6 high: } yards?

---

456 8  
 22 10

---

9)479 6

---

Yards 53 2 6 Ans.

## Example 2.

If the height of a room painted be 12 feet 4, and the compass 84 feet 11; what square yards doth it contain?

Answer, 116 yards 3 feet 3  $\frac{2}{3}$ 

Feet In  
 84 11 compass  
 12 4 high.

---

In. 1019 00  
 4  $\frac{2}{3}$  28 03  $\frac{2}{3}$

---

9) 1047 03  $\frac{2}{3}$

---

yards 116 03 3  $\frac{2}{3}$ 

Note, Double work is allowed in window shutters sash-frames and mantle-pieces are reckoned by themselves, unless the mantle pieces stand in the wainscot, and then they are to be measured as plain work deducted nothing for the vacancy.

Common coulered, 3 coats in oil, per yard

On old colour

Walnut tree colour

Marble colour, from 16d. to

Sash frames each,

Sash lights each,

Window lights, one with another.

Iron casements,

s. d.  
 0 6  
 0 4  
 1 0  
 2 0  
 1 0  
 0 1  
 0 3  
 0 3

## Joiner's Work.

**W**AINSCOTTING, the dimensions are taken as in painting, viz. by measuring the height (indenting the string wherever the plane goes, as well as the painters do wherever the brush goes), and then the compass; which multiply one into the other, dividing the product by 9 and the quotient is the answer in square yards.

Example.

Example.

What is the content of a piece of wainscoting that is 9 feet 3 long, and 6 feet 6 broad.

|       |          |
|-------|----------|
| Feet. | In       |
| 9     | 3        |
|       | 6 feet 6 |

|         |    |    |
|---------|----|----|
|         | 55 | 6  |
| 6½ Inch | 4  | 7½ |

9) 60 1½ (6½ yds. Ans.

54

6

By cross multiplication thus:

Feet. In.

|   |   |
|---|---|
| 9 | 3 |
| 6 | 6 |

|    |   |
|----|---|
| 34 | 0 |
|----|---|

|   |   |
|---|---|
| 4 | 6 |
|---|---|

|   |   |
|---|---|
| 1 | 6 |
|---|---|

|   |    |
|---|----|
| 0 | 1½ |
|---|----|

60 1½ as before which divide by 9, &c.

Once more.

There is a room wainscotted, the compass of which is 47 feet 3 inches, and the height 7 feet 6 inches; what is the content in square yards? Ans. 39½ yards.

Feet. Inche.

|    |            |
|----|------------|
| 47 | 3 compass. |
| 7  | 6 height   |

|     |    |
|-----|----|
| 330 | 9  |
| 23  | 7½ |

6½ inches.

9) 354 4½

39½ or ½ yards.

The price per yard.

|                                      |       |       |    |
|--------------------------------------|-------|-------|----|
| For good wainscot,                   | _____ | _____ | 5. |
| Wainscotting, not finding stuff, &c. | _____ | _____ | 6  |
| Coarse wainscotting,                 | _____ | _____ | 7  |
| Deal wainscotting, finding stuff,    | _____ | _____ | 1  |
| _____ not finding stuff,             | _____ | _____ | 3  |
|                                      |       |       | 1  |

Carpenter's Work.

**R**OOFING, flooring, and partitioning, the principal carpentry in modern buildings, are measured by the square of 10 feet each way, that is 100 square feet.

For roofing, multiply the depth and half depth by the front; or the front and half front by the depth, and you will have the contents.

The dimensions are taken in feet and inches.

Examples.

How many squares doth that piece of work contain that measures 199 feet 10 inches in length, and 10 feet 7 inches in height? Ans. 21 squares, 14 feet, 10  $\frac{1}{2}$  inches.

Operation.

Feet. Inches.  
 299 10 long  
 - 10 F. 7 high.

The division is performed by pointing off two places towards the right hand, and the number on the left is squares, &c.

1998 4  
 6  $\frac{1}{2}$  99 11  
 1  $\frac{5}{8}$  16 7  $\frac{10}{12}$

21, 14 10  $\frac{10}{12}$  Ans. 21 squares, 14 feet, 10  $\frac{1}{2}$  inches.

Again.

If a floor be 49 feet 7 inches, 4 parts long, and 26 feet inches broad, how many square feet?

The operation by cross-multiplication.

Feet. Inches. Parts.

|       |   |   |
|-------|---|---|
| 49    | 7 | 4 |
| 26    | 6 | 0 |
| <hr/> |   |   |
| 294   | 0 | 0 |
| 81    | 0 | 0 |
| 15    | 2 | 0 |
| 24    | 6 | 0 |
|       | 3 | 6 |
|       | 8 | 8 |
|       | 0 | 2 |
| <hr/> |   |   |

13, 14 8 4 Ans. 13 squ. 14 feet, 8 in, 4 pts.



Note, In measuring roofing, no deduction is made for skylights, chimney shafts, &c.

In measuring flooring from the content of the whole floor in feet, take the content of the vacancy for the stairs, hearths, &c. in feet, and the remainder is the true content; which bring into squares as before.

Note, In partitioning, you must measure the doors, door-cases, and windows by themselves and deduct their contents out of the whole, except by agreement, they are included: and then you must mention it in the written agreement, doors door-cases, and windows included.

There are divers sorts of carpenter's work belonging to a building, viz. Cantaviliar cornice, modillion cornice, plain-cornice, guttering, rail and ballusters, lintel, penthouse cornice, timber-front, story, brest sommers, shelving, dressing, &c. all which are measured by lineal or running measure. There are also doors and door-cases, lantern light with their ornaments, balcony doors, and cases, cellar doors and curbs, columns and pilasters, cupolas, &c. all which are valued by the piece.

*Carpenters Work is done at the following prices, viz.*

|                                             | <i>l.</i> | <i>s.</i> | <i>d.</i> |
|---------------------------------------------|-----------|-----------|-----------|
| Flooring, finding boards, the square,       | 1         | 15        | 0         |
| Not finding boards, from 2s. 6d. to         | 0         | 6         | 0         |
| Roofing with oak, — —                       | 2         | 0         | 0         |
| Not finding Timber — —                      | 0         | 12        | 0         |
| Partitioning per square, — —                | 0         | 15        | 0         |
| Not finding timber — —                      | 0         | 7         | 6         |
| Stairs with rails, and ballusters complete, | 1         | 10        | 0         |
| Sawing of oak, and elm per 100 foot,        | 0         | 2         | 6         |
| Fences for trees, — —                       | 0         | 2         | 0         |

Oak timber is commonly sold for 40s. per ton (that is 40 solid feet) in the place; ash 30s and elm 28s per ton.

Note. Carpenters measure the timber frames of any building (which they call the carcase, by the square of 10 superficial measure, or 100 square feet, as hinted before.

### *Sawyers Work.*

IN this place it may not be improper to say something in relation to the method used by sawyers, in measuring their work. When they work by the great, (as they say) most commonly they measure their work by the superficial foot so there is no great difficulty in taking the dimensions; for they account the depth of the kerf for the breadth, and the

length for the length. The dimensions being thus taken in feet, the content of one kerf superficial may be found by multiplying the length by the breadth; and then having found the number of feet in one kerf, multiply it by the number of kerfs, of the same dimensions, and you will have the number of feet in them all.

Note 1st. When thus they have cast up the whole content of their work in feet, they are paid for it by the hundred, that is, 100 feet.

2dly. That if the kerf be but six inches or less in depth; then they have a custom to be paid for kerf and a half, (as they express it), *i. e.* for half as much more as it comes to by measure; and the reason they give for it is, that the trouble is so much the more on account of often shifting or removing and new binding their timber, and therefore they insist on it as a customary price.

3dly. For breaking work that is, for cutting a piece of timber or tree through the middle, and slabbing it, (*i. e.* cutting off the out side pieces,) if the kerf be more than 11 or 13 inches deep, they are paid by the foot lineal or running measure, at different prices, according to the various depths of the kerf; and are as follows:

| Inches deep. | d. qrs. |             |
|--------------|---------|-------------|
| 15           | 1       | } per foot. |
| 18           | 1       |             |
| 20           | 2       |             |
| 22           | 2       |             |
| 24           | 3       |             |
| 26           | 3       |             |
| 28           | 4       |             |
| 30           | 4       |             |
| 32           | 5       |             |
| 35           | 5       |             |
| 36           | 6       |             |

4thly. In some places it is customary to allow the sawyer but one breaking kerf in a tree, though there be never so many kerfs deep in it. But some sawyers claim to have half breaking work, and half hundred work; that is, if they have four kerfs deep, then they will have two breaking-work and the other two hundred-work.

5thly. In sawing bevil work, as hipps, sleepers, &c. poss &c. in bevil frames, posts, or puncheons in polygonal turvets, &c. also contrails, &c. for these they work by the hundred. but always reckon kerf and half for such sort of work; that is they reckon half as many more feet of work than there is really performed.

Brick-

Bricklayers and Tilers Work.

Of Walling.

**W**ALLING is measured by the rod statute measure, being 272 feet and  $\frac{1}{2}$  superficial. The method of taking their dimensions is thus: for a wall round an orchard, or the like, they measure the length by a line going over the buttresses; and for the height they measure over the mouldings (pressing the line into them) even to the middle of the coping; they likewise take notice of the thickness of the wall, that is, how many half bricks in length the wall is in thickness: for three half-bricks, that is a brick in length, and one in breadth, is standard thickness; and all walls, whether less or more, must be reduced to that thickness by this rule, viz. Multiply the product of the length and height, by the number of half bricks that the wall is in thickness; which product divide by 3, and then the quotient by 272, (the  $\frac{1}{2}$  being generally neglected in vulgar working,) and the quotient will be rods, at a brick and a half thick standard measure.

Example.

Admit the face of the wall measure 4085 feet, and the thickness be two bricks and a half, or five half bricks thick, how many rods doth it contain?

$$\begin{array}{r}
 4085 \\
 5 \\
 \hline
 3) \quad 20425 \\
 \hline
 272) \quad 6808 \quad (25 \text{ rods Ans.} \\
 \hline
 1368
 \end{array}$$

(8)

When the work is wrought decimally, then you divide by  $272\frac{1}{2}$  or 272,25, which gives the quotient somewhat less. But the measuring of brick work may be shortened, by having the rod of  $16\frac{1}{2}$  centesimally divided into 100 equal parts, with which you take the dimensions, and the length of the wall in those rods; and 100 parts multiplied by the height gives the content in rods, of any wall that is a brick and a half thick. Deduction must be made for doors, windows, &c.

A Table to reduce brick-work to standard measure, i. e. a brick and a half thick.

*Brick*

|                 |               |                        |                                 |
|-----------------|---------------|------------------------|---------------------------------|
| 1               |               | Subtract $\frac{1}{3}$ |                                 |
| 2               |               | Add $\frac{1}{3}$      |                                 |
| 3               | } Multipl. by | {                      | 2 { Reduce to a brick and half. |
| 4 $\frac{1}{3}$ |               |                        | 3 {                             |
| 6               |               |                        | 4 {                             |

Example.

Suppose a garden wall to be 254 feet round, and 12 feet 7 inches high, and 3 bricks thick, how many rods doth it contain?

|                 |        |
|-----------------|--------|
|                 | 254    |
|                 | 12     |
|                 | <hr/>  |
| In              | 3048   |
| 6 $\frac{1}{2}$ | 127    |
| 1 $\frac{1}{2}$ | 21—2   |
|                 | <hr/>  |
|                 | 3196—2 |
|                 | <hr/>  |

In this operation the aggregate, or total, is multiplied by 2, because twice 3 is 6, the number of half bricks; and that reduces the work to standard measure as by the table above.

272)6392—4(23  $\frac{1}{2}$  rods.

### *Of Chimneys.*

This brick-work is commonly agreed for by the hearth and also sometimes by the rod; and the method of taking dimensions is thus: If the chimney stands singly, not leaning against, or being in a wall, and worked up right over the mantle tree to the next floor, it is girt about the breast for the length, and the height of the story is taken for the breadth, and the thickness of the jaumbs for the thickness. But if a chimney stands against, or in a wall, which is before measured with the rest of the building, then the breadth of the breast or front, together with the depth of the two jaumbs is the length; the height of the story the breadth, and the thickness of the jaumbs the thickness. But if the chimney stands in the corner of a room, and has no jaumbs, then the breadth of the breast is the breadth, the height of the story the length, and the thickness the thickness. And for the shaft, it is commonly girt in the smallest part, for the length: and the thickness on both sides, for the thickness; in consideration of the widths, parging, scaffolding, &c.

Note



Note, There is nothing to be deducted for the vacancy between the hearth and the mantle tree, because of the widths and the thickening for the next hearth above.

*Gable ends.*

Take half the perpendicular for the breadth, and the width of the house for the length, or half the width of the house for the breadth, and the perpendicular for the length, which brings the measure to an oblong, the content of which is found by multiplying the length by the breadth, &c.

Note, There are several other things in bricklayers work, as cornicefacias, straight arches, cheme arches, hipps and valleys, in tiling and water courses : all which are measured by the foot lineal, or running measure. Also piers, pilasters, rustic work, &c. which are valued by the piece.

|                                                  | <i>Prices</i> | <i>l.</i> | <i>s.</i> | <i>d.</i> |          |
|--------------------------------------------------|---------------|-----------|-----------|-----------|----------|
| For walls, finding materials,                    |               | 5         | 0         | 0         | per rod  |
| Not finding materials,                           |               | 1         | 10        | 0         | ditto    |
| For tiling, finding materials,                   |               | 1         | 5         | 0         | per squ. |
| Not finding materials,                           |               | 0         | 5         | 0         | ditto    |
| For tiling finding materials, except }<br>tiles, |               | 0         | 10        | 0         | per rod. |
| For stripping without taking down,               |               | 0         | 5         | 6         | ditto.   |
| With taking down,                                |               | 0         | 7         | 0         | ditto.   |
| For pointing,                                    |               | 0         | 2         | 0         | ditto.   |

*Paving.*

Pavement for cellars, wash-houses, &c. is measured by the square yard.

*Example.*

If a cellar, wash-house, or court-yard be paved with bricks, or pitched with pebble, being 9 yards 2 feet long, and 6 yards 2 feet broad ; how many yards square doth it contain ?

Ans. 64 yards 1 and  $\frac{1}{4}$  feet, as by the following work.

Yds.

Yds. F.

$$\begin{array}{r} 9 \quad 2 \\ 6 \quad 2 \\ \hline \end{array}$$

$$\begin{array}{r} 54 \quad 0 \\ 6 \quad 0 \\ 4 \quad 0 \\ \hline 1 \frac{1}{4} \end{array}$$
64  $1 \frac{1}{4}$  Ans.

Yds. F.

$$\begin{array}{r} 9 \quad 2 \\ \hline 6 \text{ yards } 2 \end{array}$$

$$\begin{array}{r} 57 \quad 0 \\ 3 \quad 08 \\ 3 \quad 08 \\ \hline 64 \quad 1 \frac{1}{4} \end{array}$$

Feet

$$\begin{array}{r} 29 \\ 20 \\ \hline \end{array}$$

9) 580

Yds 64  $\frac{4}{9}$ 

Here the answer is found by three different operations, and the result of each is the same.

*Slating.*

Is valued by the square of 100 feet; in some places by the rod of 18 feet square; that is 36 square yards, or 324 feet.

Note, In tiling and slating, where there are gutters and valleys, there is commonly an allowance, which is to take the length of the roof all along upon the ridge which makes the gutter double measure; which in some places is allowed in others, not. Sometimes there is an addition for hollow ware, that is, ridge tiles, gutter tiles, corner and dormer tiles, and here customs differ; for in some places they account one superficial foot for every foot lineal or running measure; then 100 feet lineal is reckoned a square. In other places, for every 100 of such tiles they reckon one square.

*Plastering.*

Is of two kinds, viz. First, work lathed and plastered, sometimes called ceiling. Secondly, plastering upon brick work, or between the quarters in partitioning, by some called rendering, both which are measured by the yard square, as the joiners and painters do. In taking dimensions of ceiling, if the room be wainscotted, they consider how far the cornice bears into the room, by putting up a stick perpendicular to the ceiling, close to the edge of the uppermost part of the cornice; and measure the distance from the perpendicular stick to the wainscot; twice which distance must be deducted from the length and breadth of the room taken upon the floor, and the remainder is the true length and breadth of the

the ceiling: As suppose a floor is 24 feet long, and 18 feet broad, and the cornice shoots out 6 inches; deduct a foot for both ends, and the length of the ceiling is 23 feet; and the same for the breadth; it leaves 17 feet broad; which multiplied together, gives the content, 391 feet, or 43 yards and a half.

Example.

23 feet the length.  
17 feet broad.

$$\begin{array}{r} 161 \\ 23 \\ \hline \end{array}$$

$$\begin{array}{r} 9)391 \text{ (43 yards, 4 feet.} \\ 36 \\ \hline \end{array}$$

$$\begin{array}{r} 31 \\ 27 \\ \hline \end{array}$$

4

If the ceiling of a room be 19 feet 10 one-way, and 17 feet 6 the other, how many square yards doth it contain?

By cross multiplication, thus:

$$\begin{array}{r} 19 \quad 10 \\ 17 \quad 6 \\ \hline 133 \quad \\ 19 \quad \\ 14 \quad 2 \\ 9 \quad 6 \\ \hline 5 \end{array}$$

$$9)347 \quad 1 \text{ (38 Yds. 5 feet 1 Inch.}$$

How many yards square are there in a piece of plastering that is 47 feet 4 inches 7 parts long, and 18 feet broad?

Ft. In. Pt.

47 4 7

3 times 6 is 18

$$\begin{array}{r} 142 \quad 1 \quad 9 \\ 6 \\ \hline \end{array}$$

$$9)2106 \text{ (94 yards, 6 feet, 10 inch. 6 parts.}$$

Prices

*Prices per yard.*

|                                                                     | s. | d.              |
|---------------------------------------------------------------------|----|-----------------|
| For every yard of common plastering, finding laths, }<br>nails, &c, | 0  | 9               |
| Not finding laths — — —                                             | 0  | 4 $\frac{1}{2}$ |
| For white washing with size — — —                                   | 0  | 1 $\frac{1}{2}$ |
| Partitioning, finding all materials. — — —                          | 0  | 3               |

*Masons Work.*

**T**HE masons work, consisting of stone, is of two sorts viz. superficial and solid. Pavements, and the face of stone walls houses &c. are measured as brick work. If the work have ornaments, as capitals pilasters, rails, and ballusters, &c. then they are valued by the piece.

|                                                                                            | s. | d. |
|--------------------------------------------------------------------------------------------|----|----|
| For every foot of plain work in walls, &c.                                                 | 0  | 8  |
| For plain cornice, about — — —                                                             | 1  | 5  |
| For rough stone wall, with lime, 16 feet $\frac{1}{2}$ long, and }<br>1 foot high, per rod | 1  | 2  |
| Without lime, per rod, — — —                                                               | 0  | 3  |
| Paving, digging the stone, and all workmanship, per }<br>square foot                       | 0  | 3  |

*Prices of Stone and Urns.*

Rough paving 1d. per foot; rough asher, or coping, 1 $\frac{1}{2}$ d. per foot: fine asher 3d. per foot; base per foot 1d. carbe per foot 6d. urns 3 feet high 1l 4 feet high 1l. 10s. 5 feet high 2l. and 6 feet high 3l.

*Land Measure.*

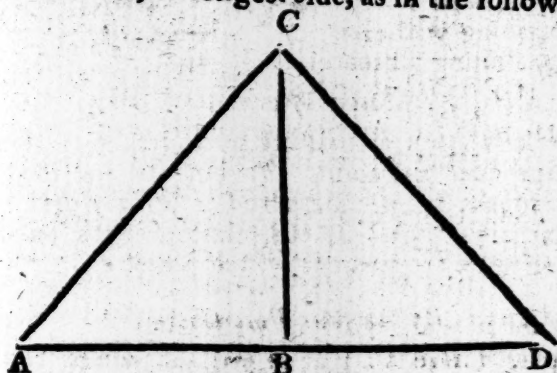
**L**AND is usually measured by the acre. The dimensions are taken with a chain of four poles in length which is divided into 100 parts called links; and 10 square chains make an acre. Let them be 10 in length, and 1 in breadth, or 5 in length and 2 in breadth, &c. or 160 square poles; but to find its content (if not regularly square) it is generally divided into triangles: Thus a piece of land of 4 sides (if not square) may be divided into two triangles, pieces of 5 sides into 3, and a 6 sided piece into 4 triangles.

*To Measure a Triangle.*

Admit the longest side of the following triangle, viz. A D to be 76 poles, and the perpendicular or doted line B C to be 30 poles; multiply 76 (the base) by 15, the half of the perpendicular B C, and it produces 1140. Or if you multiply the whole perpendicular by half the base (or longest side



side) it will produce the same; which, divided by 160, (the square poles in an acre) the quotient gives the content of that piece of land in acres; and what remains multiply by 4, and divide by the same divisor, and it quotes roods, &c. Note, Always the perpendicular is drawn from the opposite angle to the base, or longest side, as in the following figure.



*The operation.*

76 The base.

15 Half the perpendicular.

$$\begin{array}{r}
 16 \overline{) 01140} \quad (7 \text{ acres } \frac{3}{10} \text{ or } \frac{1}{4} \\
 \underline{112} \phantom{0} \\
 2 \phantom{0}
 \end{array}$$

All other pieces of land (for the most part) must be divided into triangles, and when measured, their contents added together.

Suppose an oblong plat of ground contain 35 poles broad, and 185 poles long: how many acres is the content?

*Rule.*

Multiply the length in poles by the breadth, and divide the product by 160, (the square poles in an acre,) and the quotient will be the answer in acres; and if the remainder

$$\text{Be } \left\{ \begin{array}{l} 120 \\ 80 \\ 40 \end{array} \right\} \text{ its value is } \left\{ \begin{array}{l} \frac{3}{4} \\ \frac{1}{2} \\ \frac{1}{4} \end{array} \right\} \text{ of an acre.}$$

*The*

*The Work.*

185 the length.  
35 the breadth.

---

925  
555

---

160)6475(40 acres.  
640

---

75  
deduct 40 a quarter.

---

35 poles remain.

*By the four Pole Chain.*

Example. There is a plat of ground which contains 16 chains and 25 links in breadth, and 57 chains and 30 links in length; what is the contents of that piece of land?

C. Link.

57, 30 length.  
16, 25 breadth.

---

28650  
11460  
34380  
5730

---

acres 92 | 11250 cut off two places.

---

4

---

No rods, 45000

---

40

Poles 18 | 000)92 ac. 0 rood, 18 pole Ans.

Note, 4 roods or rods in one acre, 40 poles one rood or rod, so that 1 rood or rod is 1 quarter of an acre.

Note also, that the above chain commonly called Gunter's chain contains 4 statute poles in 100 links, so that any number of chains are no more than 60 many 190 links, as 4 chains are 400 links, and 6 chains are 600 links, &c. 160 statute poles are an acre, each pole being 16 feet and a half; therefore in a square chain there are 16 square poles; and if you divide 160 (the square poles in an acre) by 16 (the square poles in a chain) the quotient is 10, the square chains in an acre.

A square

A square chain contains 10,000 square links, (or 100 multiplied by 100), and therefore it follows that an acre contains 100,000 square links.

*To reduce Statute to Customary Measure.*

According to a statute made in the 33d of Edward the first, and another in the 25th of Queen Elizabeth, a statute pole is, 16 feet and an-half long, (as said before): but in divers parts of England there are used poles of 18 others of 21, and some of 24 feet long, called customary measure being an use according to the humour or custom of the place where they are taken. To turn therefore one sort of measure into the other, admit statute measure to be turned into customary, do, thus: Multiply the number of acres, roods, and poles statute measure, by the square half yards, or square half feet in a square pole of statute measure, and divide the product by the square half yards, or square half feet, contained in the pole of the measure customary and the quotient gives the answer in the latter, in acres, roods, &c.

*Example.*

In 172 acres statute measure, how many acres of 18 feet to the pole or perch?

acres 172 statute measure.

821 square half yards.

144)20812(144<sup>76</sup> acres customary measure.

In a statute pole are 11 half yards, which squared make 121 square half yards; and in a square pole of, 18 feet, are 144 square half yards, &c. For the remainder work as before, viz. by multiplying it by 4, &c, and the next remainder by 40, &c. as spoke to before: so that the answer is, that 172 acres statute measure, make 144 acres, 2 roods and 4 poles of such customary measure

*An Example of the contrary.*

In 543 customary acres of 18 feet to the pole, how many acres of statute measure, being 9 feet and a half to the pole.

543 customary.

144 square half yards in a customary acre.

$$\begin{array}{r} 2172 \\ 2172 \\ \hline 543 \end{array}$$

121)78192(646 statute acres.

720

55. &c.

R

The

The remainder 26 multiplied by 4 produces 104, which not amounting to a rood should be multiplied by 40, their product is 4160, which divided by 121, quotes 34 perches, and 46 remains. So the answer is, that 543-customary acres, of 18 feet to the pole, makes 646 acres, 34 poles, and  $\frac{46}{121}$  of a pole.

Note, Customary acres, as well as statute acres, contain 160 square poles or perches; the excess of bigness by the bigness of the pole.

*Solid Measure.*

**I**S that of timber, stone digging, liquids, &c. and the rule for working is to multiply the length taken in inches, and the breadth together, and then that product by the depth or thickness, and the last product will be the content in cubic inches; which if timber or stone, divide by 1728, (the cubic inches in a foot solid), and the quotient gives the content in solid feet.

*Example.*

If a tree be 16 feet long, and 18 inches square how many solid feet doth it contain?

|            |     |                            |
|------------|-----|----------------------------|
| Multiply } | 18  | 16                         |
|            | 18  | 12                         |
|            | 324 | 192                        |
|            |     | the length in inches.      |
|            |     | 323 breadth and thickness. |
|            |     | 768                        |
|            |     | 344                        |
|            |     | 576                        |
|            |     | 1728)62208                 |
|            |     | 5184 . (36 feet            |
|            |     | 10368                      |
|            |     | (0)                        |

*Decimally;*



Decimally.

By Practice.

Square } 1, 5  
          } 1, 5

1—7  
1—6

2, 25 breadth.  
16 length 6½ inches

1—6  
9

36, 00 Ans.

2—3  
4 times 4 is 16

9—0

feet 36—0 An.

In solid measure,

40 feet of round }  
50— of hewn } timber is a ton or load.  
1728 inches is a foot of stone or timber.  
27 feet is a yard.  
282 inches is a gallon of ale or beer  
231 inches is a gallon of wine.

Suppose there is given an oblong piece of timber, whose breadth is 2,25, and thickness 1, 64 feet, and length 3,65 feet, how many solid feet are contained therein?

2,25 breadth,  
1,64 thickness.

900

1350

225

3,6900

36,5 length:

184500

221400

110700

134,68500 Ans. 134,685 solid F. or 134½ nearly  
Of Timber Measure.

WHEN at any time you would know the content of any piece of timber by vulgar or decimal arithmetic observe what follows, viz. The tree being girted and one fourth are taken for the side of the square; multiply the length of the side of the square in inches into itself, and that

R 2

product

product by the length in feet: which last product divide by 144; but if you multiply by the length in inches, then your divisor must be 1728; and if any remain, divide such remainder by 12, and the quotient will be the odd inches.

Example.

Suppose a piece of timber 15 feet long, and a quarter of the girt 42 inches; what is the content of that piece?

*The Work.*

42 inches the side of the square

42

84

168

1764

15 feet in length.

F. 1.

144) 26460 (183-9 Ans.

144

1206

1152

540

432

12) 108 (9 inches.

(0)

Note. In this example 1764 is multiplied by 15 in one line.

But the foregoing example may be worked shorter by decimals thus:

Squared } 3.5 the side of the square 42 inches.  
3.5

175

105

12,25 the product are feet.

15 feet the length.

6125

1225

183,75 the cont. viz.  $183\frac{75}{100}$  or  $\frac{3}{4}$  as before

But

But this common way of taking  $\frac{1}{2}$  of the compass for the side of a square, which is equal to the content of the circle in round timber, is erroneous, and gives the solidity somewhat less than the true content: but the true way is to multiply half the diameter by half the compass, and then that product multiply by the length, which divide by 1728, and the quotient is the content. If you cannot come to measure the end of the piece, you may know the diameter by this proportion, viz. as 22 is to 7, so is the compass to the diameter. Or you may find the side of a square of a round piece of timber by this rule, viz. Multiply 2821 2821  
by the inches of the compass. In, 66 the compass.  
pass, and cut off 41 figures to the right hand 16976  
of the product.

186136 Ans. 18  $\frac{6}{16}$  inches nearly.

Having the breadth and depth of a piece of timber or stone; to know how much in length of it will make a solid foot; multiply one by the other, and let the product be a divisor to 1728, thus:

24 broad.  
18 thick.

192  
24

432) 1728 (4 inches in length.  
1728

And that you may make a table to serve all breadths and depths, by which much labour may be saved in multiplying and dividing, and yet measure any piece of timber thereby very exactly.

In square timber, you must make the inches squared a divisor to 1728, and the quotient will be the answer in inches of length, and that will make a foot solid.

Example. If a piece of timber be 8 inches square, what length of it will make a foot?

R: 3.

64)

64) 1728 (27      Answer, 27 inches, or 2 feet  
       128            3 inches in length.

448

448

(0)

Here the square of 8 is 64 &c.

Again. Suppose a piece be 18 inches square, what length will make a foot? Answer, 5 inches and  $\frac{1}{2}$ .

The square of 18 is 324) 1728 ( $5\frac{108}{18}$  or  $\frac{1}{2}$

1620

(108)

The usual way for tapering timber, is by this method, viz. take the dimensions in the middle, and multiply that by the length, which is not accurate; but if the dimensions be taken in several places and the mean be used, the content thus found will be near the truth.

### Digging.

**I**S measured by the solid yard of 27 feet; that is, 3 times 3 is 9, and 3 times 9 is 27, by which are measured vaults, cellars, clay for bricks, &c. Other things are measured by the floor of 324 solid feet.

Example 1. If a vault or cellar be digged 9 feet deep, 4 feet  $\frac{1}{2}$  long, and 3 feet 9 inches broad; what is its content in solid yards?

Feet.

4  $\frac{1}{2}$  long

9 deep.

40  $\frac{1}{2}$

3 F. 9 broad

121  $\frac{1}{2}$

20  $\frac{1}{2}$

16

6 inches  $\frac{1}{2}$

3 is  $\frac{1}{2}$  of 6

27) 151  $\frac{1}{2}$  (5 yards, 16 feet  $\frac{1}{2}$

16

Example



Example 2.

How many yards of digging will there be in a vault that is 25 F. 4 long, 15 F. 8 broad, and 7 F. 1½ deep.

25 74

3 times 5 is 15.

76 0

5

380 0

8 5 ½

8 5 ½

4 F. is ½

4 F. is ½

396 10 ½

7 ½

2778 12 ¾

198 5 ½

Yd. F. In.

27) 2976 80 (110 6 8

27

1706

Example 3. There is a mote that is 648 feet long, 24 feet broad, and 9 feet deep; how many floors?

648 long.

24 broad.

2592

1296

15552

9

Divide by 324) 139968 (432 floors. Ans.

&c.

(o)

Solid Bodies being frequently painted, it is necessary to know how to find their superficiality: To find the superficial content of a square, or many sided round pillar: multiply the

sum

Sum of the sides, or circumference, by the height in feet; and the product, divided by 9, will be square yards.

*Of a Globe.*

Multiply the circumference in feet by itself, and then that product by this decimal, 0,0353678, and this last product, will be the content in yards.

To find the superficial content of a pyramid or cone, multiply half the sum of the sides, or half the circumference of the base by the slant height in feet; and the product, divided by 9, will be square yards.

If the pyramid or cone be not complete, that is, if a part of the top be wanting, add together the circumferences at top and bottom, and half their sum, being multiplied by the slant height, will be the superficial content.

Note. A solid yard square of clay will make about 7 or 800 bricks: and the price of making is 7 or 8s. a thousand: 3 bags (or bushel) and a half of lime, and half a load of sand, will lay 1000 bricks.

500 bricks

1000 plain tiles } make a load.

25 bags 1 Cwt. of lime.

**I**T may nothere be improper, as well for refreshing the memory, as for improving the understanding, and forming the mind with proper notions and ideas of measuring, to give a short repetition by demonstrative geometrical figures, to explain what hath been verbally and arithmetically before expressed.

And first for planometry, or superficial or flat measure some of which is measured by the foot square; as are boards, glass, marble, freestone, and pavements, the dimensions are taken in feet and inches, and the content given in square feet.

Example 1. Suppose there is an oblong or long square, let it be board, glass, or pavement, &c. that contains on the longest side (or the length) 14 feet and a half, and the shortest side (or breadth) 1 as in the following figure, viz.

F. 24  $\frac{1}{2}$ .  
Area in content is  
349 F. 124

14, 25 breadth.  
24, 5 length.

7125  
5700  
2850

349, 125

Rule. Multiply the length by the breadth and cut off as many places to the right hand as there are decimals in the length and breadth.

Example 2. Suppose a board or piece of glass be in the form of figure the first, called rhombus, that is in the shape of a common pane of glass, or diamond square.

Rule. To measure which, multiply the breadth A. B. by the length of any of the sides, (for they are all equal) and cut off as many places to the right hand as there are decimal places in both multiplicand and multiplier, as hinted before. As suppose the breadth A. B. 8 feet 38 parts, and the length of the side to be 8 feet, 52 parts; then the work will appear thus,

F. P.  
8, 52  
8, 38

6816  
2556  
6816

713976

3976 is separated by a comma, as above directed, and are so many 1000 parts of a foot.

Example 3. Again, admit a piece of measurement to be the form figure of second, called a rhomboides: its length 17 feet 25 parts, and its breadth 1 foot 58 parts.

F. P.

Here the multiplication is as in whole numbers, and the content or answer is found to be 71 square feet, and  $\frac{1876}{10000}$  ten thousandths of a foot, or 4 inches  $\frac{1}{2}$ .

F. P.

17,25 length.

8,58 breadth.

---

13800

8625

---

13800

---

184,00050 Ans. the content is 148 feet.*Once more.*

Suppose a board, piece of glass, pavement, or piece of land to represent, or be in form of a triangle, or three cornered figure, expressed as in the shape of figure the third, every triangle is half an oblong, whose length and breadth is equal to the perpendicular and base.

Note, the dotted line is the perpendicular, the bottom line the base, and the line from the top of the perpendicular to the left angle of the base is called the hypothenuse.

The measuring of a triangle hath been already shewn, and therefore I shall desist speaking any further thereto.

The fourth figure is called the trapezium, and consists of 4 sides; this figure, before it can be measured, must be divided into two triangles, thus, viz. by a line drawn from one angle or corner, to the angle opposite to it as in the figure.

Example 4 Suppose the dimensions of the trapezium before described to be, viz. the base 16 F. 67; the one perpendicular 13 F. 50 and the other 9 F. 68 (as in figure 5), what is the content?

*The Operation.*

One perpendicular

The other

F. P.

12,50

9,68 } add

---

The sum is

22,18

The half sum is

11,09 which

multiply by the whole base

16,67

---

produces 184,8703

which is 184 feet and  $\frac{8703}{10000}$  of a foot, equal to 10 $\frac{1}{2}$  inches and an half.

Note, If two sides of a trapezium are parallel, that is, equidistant, then add them together, and half the sum multiplied by the nearest distance between those two sides gives the content.



tent. Or if you measure in the middle between two sides or lines that are of equal length, the answer will be the same.

Note also, The painting, plastering, &c. of irregular pieces in the form of triangles, or not, if divided as above, may be measured as before; and brought into yards (if the content is to be so given in) by dividing by 9, as before shewn.

*Of Regular Figures.*

**F**IGURES that have more than four sides, are called polygons, and those of them that have their sides and angles equal, are called regular polygons.

Regular polygons have their names from the number of sides; thus a figure having

|    |                                  |
|----|----------------------------------|
| 3  | Trigon, or equilateral triangle. |
| 4  | Tetragon, or square.             |
| 5  | Pentagon.                        |
| 6  | Hexagon.                         |
| 7  | Heptagon.                        |
| 8  | Octagon.                         |
| 9  | Nonagon.                         |
| 10 | Decagon.                         |
| 11 | Undecagon.                       |
| 12 | Dodecagon.                       |
| 15 | Quindecagon.                     |

equal sides, is called a

The area of a pentagon may be found by multiplying the square of its side by the number 1,7204774.

Thus, if the side of a pentagon be 11 feet, then the square thereof will be 11 times 11, or 121 feet.

Multiply by 1,7204774.

121

17204774

34409548

17204774

208.1777654

Therefore the area of the pentagon will be upward of 208 square feet.

In

In like manner, to find the area of the

|            |                                         |            |
|------------|-----------------------------------------|------------|
| Trigon,    | ) multiply the square<br>of the side by | 0.4330127  |
| Tetragon,  |                                         | 1.0000000  |
| Hexagon,   |                                         | 2.5980762  |
| Heptagon,  |                                         | 3.6397024  |
| Octagon,   |                                         | 4.8284271  |
| Nonagon,   |                                         | 6.1818242  |
| Decagon,   |                                         | 7.6942088  |
| Undecagon, |                                         | 9.3656404  |
| Dodecagon, |                                         | 11.1961524 |

*Of a Circle. Figure the ninth.*

A CIRCLE is contained under one line, called the circumference or periphery, as A B C. All right lines drawn from the centre E, to the circumference, are equal, and called radiuses, or half diameters; and the long line through the centre from A to C is the diameter.

To divide a circle in 6 equal parts, extend the compasses to half the diameter, as from A to the centre E, and the extent applied to the circumference will divide it into those parts.

The diameter A C divides the circle into two equal parts, each of which is called a semicircle; and if a semicircle be divided into two equal parts, those parts are called quadrants.

The questions relating to the measuring of the circle and its parts may be solved as follows:

1. The diameter being given, to find the circumference.

Rule. Multiply the number 3.1415927 by the diameter, and the product will be the circumference.

Note, The number 3.1416 will be exact enough in most cases.

Example. The diameter of a circle being 11 inches, what is its circumference?

3, 1416

11

34, 16

3, 1416

Ans. 34.5576 (or above 34½) inches.

2. The diameter being given, to find the area.

Rule. Multiply the number 0.7853982 (or in common cases 0.7854) by the square of the diameter, and the product will be the area.

Example

Example. What is the area of that circle whose diameter is 11 inches?

11 times 11 is 121 0,7854

$$\begin{array}{r} 121 \\ \hline 7854 \\ 15708 \\ \hline 7854 \end{array}$$

Ans. 95,0334 square inches.

3. The circumference being given, to find the diameters.

Rule. Multiply the number 0,3183099 (or in common 0,31831) by the circumference, and the product will be the diameter.

Example. What is the diameter of that circle whose circumference is  $34\frac{1}{2}$  inches?

$$\begin{array}{r} 34\frac{1}{2} - 34,5 \quad 0,31831 \\ \hline 34,5 \\ \hline 159155 \\ 127324 \\ \hline 95493 \end{array}$$

Ans. 10,981695 (or almost 11) inches.

4. The circumference of a circle being given, to find its area.

Rule. Multiply the number 0,0795775 (or in common 0,0796) by the square of the circumference, the product will be the area.

Example. What is the area of a circle whose circumference is  $34\frac{1}{2}$  inches?

$$\begin{array}{r} 34,5 \quad 1190,25 \\ 34,5 \quad 0,0796 \\ \hline 1725 \quad 714150 \\ 1380 \quad 1071225 \\ 1035 \quad 833175 \\ \hline \end{array}$$

1190,25 Ans. 94,743900 (or almost 95) sq. inch.

5. The area of a circle being given, to find its diameter.

Rule. Multiply the square root of the area by the number 1,12837, and the product will be the diameter.

S

Example

Example. What is the diameter of that circle whose area is 95,0334 square-inches?

$$\begin{array}{r} 95,0334 \text{ (9.75} \\ 81 \end{array}$$

$$\begin{array}{r} 187)1403 \\ 1309 \end{array}$$

$$\begin{array}{r} 1945)9434 \\ 9725 \end{array}$$

$$\begin{array}{r} 1,12837 \\ 9.75 \end{array}$$

$$\begin{array}{r} 564185 \\ 789859 \\ 1015533 \end{array}$$

$$11,0016075$$

Ans. The diameter is 11 inches.

6. The area of a circle being given, to find its circumference.

Rule. Multiply the square root of the area by the number 3,5449, and the product will be the circumference.

Example. What is the circumference of that circle whose area is 95,0334 square inches?

$$\begin{array}{r} 95,0334(9.75 \\ 3,549 \\ 9,75 \end{array}$$

$$\begin{array}{r} 177245 \\ 248143 \\ 319041 \end{array}$$

$$34,592775$$

Ans. The circumference is  $34\frac{1}{2}$  inches.

7. To measure the sector of a circle. See figure 10.

Case the first. If the length of the arch D E and the semi-diameter C E be given :

Rule. Multiply the length of the arch by  $\frac{1}{2}$  the semi-diameter, and the product will be the area.

Case the second. If the number of degrees contained in the arch, and the semi-diameter be given :

Rule. Multiply the square of the semi-diameter by the number of degrees contained in the arch, and that product by the number 0,0087267, and the result will be the area required.

Example. Let the arch consist of 90 degrees, or  $\frac{1}{2}$  of the circumference, and the semi-diameter be  $3\frac{1}{2}$ .



|       |         |            |
|-------|---------|------------|
| 35    | 12,25   | 0,0872 67  |
| 35    | 90      | 110,25     |
| 175   | 1102,50 | 436335     |
| 105   |         | 174534     |
| 12,25 |         | 872670     |
|       |         | 872670     |
|       |         | 9,62118675 |

Of Solid Measure.

**S**OLID or cube measure hath been already defined, (as well as superficial measure) some of the fingers of which are numbered 6, 7, and 8.

To measure a solid in form of a cube, which hath length breadth and thickness all equal, you must multiply these into themselves, and the last product gives the solidity or content, either of wood or stone. A cube hath six sides, and is in shape like a die.

Example. What is the solidity of a cube whose side is 12 inches?

$$\begin{array}{r} 12 \\ \times 12 \\ \hline 144 \\ \times 12 \\ \hline \end{array}$$

1728 the solid inches in a solid foot.

To measure a solid of an unequal length, breadth, and thickness, multiply the length by the breadth, and that product by the height; the last product will be the solidity.

Example. What is the solidity of a block of marble whose length is 10 feet, breadth  $5\frac{1}{2}$  feet, and depth  $3\frac{1}{2}$  feet?

$$\begin{array}{r} 5,75 \\ \times 3,5 \\ \hline 2875 \\ \times 1725 \\ \hline 20,125 \\ \times 10 \\ \hline \end{array}$$

201,25 the solidity.

The cone is measured by finding the superficial inches at the bottom or base thereof; which multiply by one third of the

the inches in the length, and that product is the solid quantity in inches; which inches divide by 1728, and the quotient gives the answer in solid feet.

Example of finding the solidity of the cone, decimally, without dividing by 1728.

Let the diameter of the base be 2 feet 6 inches, and the altitude 10 feet 6 inches.

2,5 the diameter.

2,5

125

50

6,25 the square of the diameter.

7854

2500

3125

5000

4375

4,908750 the area of the base.

3,5 one third of the height.

24543750

147262,0

17,1806250 the solidity in feet.

This method may serve for tapering timber, or for any other thing of the shape represented in figure 7.

*To Measure a Pyramid.*

Rule. Multiply the area of the base or bottom by one third of the perpendicular height, and the last product will be the content in solid feet; or one third part of the area at the base, multiplied by the whole altitude, gives the content also.

*Examples of both Ways.*

Suppose there is given a square pyramid (or figure like a spire steeple) the side of whose base is 4 feet and a half, and the perpendicular height 18 feet; what is the solid content?

|                        |                                                   |
|------------------------|---------------------------------------------------|
| 4,5                    | 6,75 $\frac{1}{2}$ of 20,25 the area of the base. |
| 4,5                    | 18 the whole height.                              |
| 225                    | 5400                                              |
| 180                    | 675                                               |
| 20,25                  | 121,50 Ans. 121,50 as before.                     |
| 6 $\frac{2}{3}$ of the |                                                   |
| Altitude               |                                                   |

121,50 Answer 121 Feet,  $\frac{10}{100}$  or  $\frac{1}{10}$ .

When one side of the base is longer than the other, as admit one to be 2 F.  $\frac{1}{2}$ , and the other 1 F.  $\frac{1}{2}$ , then multiply the length of the base by the breadth, and that product by one third of the height as before.

If the base be any polygon, find its area by the rule given in page 230; and then multiply it by  $\frac{1}{3}$  of the height.

*To measure the Frustum or Segment, i. e. a piece or part of a Pyramid whose ends are similar regular Polygons.*

Multiply together the sides of the greater and lesser polygons; multiply also the difference of those sides by itself; add the  $\frac{2}{3}$  part of the second product to the first product; multiply the sum by the height, and by the number, which belongs to the polygon in page 230, so shall the last product be the solidity.

*To measure the Frustum or Segment of a Cone.*

Multiply together the diameters at the top and the bottom of the Frustum; multiply also their difference by itself; and the  $\frac{2}{3}$  part of the last product to the first; and multiply the sum by the height of the Frustum, and by the number 7853981; so shall the last product be the solidity required.

Example. What is the solidity of the Frustum, of a Cone; the diameter of the greater end being 4 feet, that of the lesser end 2 feet, and the height 9 feet?

|   |                       |
|---|-----------------------|
| 4 | 2 diff. of diameters. |
| 2 | 2                     |
| — | —                     |

8 product of diameters 4;  $\frac{2}{3}$  of which is 1  $\frac{1}{3}$  8 added  
 9  $\frac{1}{3}$  is 9  $\frac{1}{3}$  which multiplied by 9, the height produces 84.  
 S 3 Then

Then multiply 0,7854  
by 84

---

31416  
62832

---

Solidity 65,9736

. Of Gauging.

**T**HERE is a near sort of kindred or affinity between the art of measuring timber, and that of gauging or measuring of liquors; for both are performed by cube or solid measure, and therefore not improper closely to follow one another. For as often as there is found 728 solid or cubic inches in a piece of timber, (of what form soever) so many solid feet it is said to contain. So likewise in the art of gauging so many times as 282 (the solid inches in a beer or ale gallon) are found in any vessel of such liquor, so many gallons is such a vessel said to hold. And so of wine; but in that the divisor alters, it being 231 solid or cubic inches.

And the gallon of dry measure contains  $272\frac{1}{4}$  cubical inches.

Note, Every cubical foot in beer or ale measure, contains 6 gallons and almost a pint.

The same in wine-measure is 7 gallons, and almost 2 quarts.

A cubical foot of dry measure contains 6 gallons and somewhat above one third of a gallon.

141 inches make 2 quarts of beer or ale; 70 inches  $\frac{1}{2}$  one quart, and 35 inches  $\frac{1}{4}$  of a pint,

To find the content of any vessel that hath the form of a cube, that is, a figure whose breadth, depth, and length are all equal, and is very well represented by the shape of a die commonly played withal,

Rule. Multiply the side into itself, and then again that product by the side; which last product, if for beer or ale, divide by 282, the inches in a beer or ale gallon, and for wine, brandy, &c. by 231 the inches contained in a wine gallon.

Example. Suppose a cube, whose side is 79 inches, I demand the solid contents in beer and wine gallons?



|                     |                   |                   |
|---------------------|-------------------|-------------------|
| 79                  | 282) 493039 (1748 | beer or ale gall. |
| 79                  | 282 ...           | Wine G.           |
| <hr/>               | <hr/>             | 231) 493039 (     |
| 711                 | 2110              | 492 ...           |
| 553                 | 1974              | <hr/>             |
| <hr/>               | <hr/>             | .310              |
| 6241                | 1363              | 231               |
| 79                  | 1128              | <hr/>             |
| <hr/>               | <hr/>             | 793               |
| 56169               | 2359              | 693               |
| 43687               | 2256              | <hr/>             |
| <hr/>               | <hr/>             | 1009              |
| 493039 Cube inches. | (103)             | 924               |
|                     |                   | <hr/>             |
|                     |                   | (85)              |

To find the content of a parallelepipedon, which is a solid figure contained under six sides, of which the opposites are parallel, and of the form of figure the 12th.

Rule. Multiply the length by the breadth, and that product by the depth; and then divide by 282 for beer or ale, and 231 for wine.

Example. Admit the length to be 95 inches, and the breadth 62 inches, and the depth 23 inches: what is the contents in beer and wine gallons?

|                                |            |
|--------------------------------|------------|
| 231) 135470 (586 wine gallons. | 95 length. |
| 1155                           | 62 breadth |
| <hr/>                          | <hr/>      |
| 1997                           | 190        |
| <hr/>                          | 570        |
| &c.                            | <hr/>      |
| Rem. (104)                     | 5890       |

5890  
23 depth.

17670  
11780

282) 135470 (480 beer gallons.

1128  
&c.

Rem. (110)

To Gauge a Back or square Tun.

Example. Suppose its length 112 inches, breadth 72 inches

inches, and its depth 48 inches; what is its contents in solid inches, and also its contents in beer gallons?

|             |                                 |
|-------------|---------------------------------|
| 112 length. | 282) 387072 (1372 Gallons, Ans. |
| 72 breadth. | 282 . . .                       |
| <hr/>       | <hr/>                           |
| 224         | 1050                            |
| 784         | 846                             |
| <hr/>       | <hr/>                           |
| 8064        | 2047                            |
| 48 depth    | 1974                            |
| <hr/>       | <hr/>                           |
| 64512       | 732                             |
| 32256       | 564                             |
| <hr/>       | <hr/>                           |

387072 solid inches, (168)

To bring these gallons into barrels, divide them by 36, the gallons in a barrel of beer, thus:

|              |                                      |
|--------------|--------------------------------------|
| 36) 1372 (38 | Ans. 38 barrels and $\frac{4}{18}$   |
| 108 .        | or $\frac{1}{3}$ of a barrel and for |
| <hr/>        | the remainder 168, it is             |
| 292          | something above half a gal-          |
| 288          | lon.                                 |
| <hr/>        |                                      |

(4)

Note, The duty of excise upon strong ale and beer, is 6s. and 6d. per barrel; brewers are allowed three barrels in twenty-three for leakage, &c. both for strong and small beer: and for ale, two in twenty two: So that the neat excise of a barrel of strong beer to be paid by the common brewers, is 3s. 7 $\frac{1}{2}$ d. and  $\frac{1}{4}$  of a farthing, and of ale, 5s. 10 $\frac{1}{2}$ d. and  $\frac{1}{4}$  of a farthing; and for small beer, 1s. 3 $\frac{1}{2}$ d. and  $\frac{1}{4}$  of a farthing.

#### *How to Guage a Copper, round Tub, or Cask.*

If it be of equal bigness both at top and bottom, find the cube inches that it contains, and then bring it into gallons as before.

But if it be wider at the top than at the bottom, or the contrary; then take the width or diameter of the tub somewhat above the middle, next to the broadest end, if it be taper; or find the mean diameter thus; suppose the bung diameter to be 26 inches, and the head diameter of the cask to be 23 inches, the difference between which is 3 inches, two thirds of which make two inches; which added to the lesser of the two diameters, make 25 for the mean diameter sought,

sought. Having the mean diameter, proceed to find the contents in solid inches, thus: First square the mean diameter, multiply that square by 0,7854, and the product will give the contents of the liquor at one inch deep, and this multiplied by the length will give the solid inches in the copper, tub, or cask.

Example. Suppose the mean diameter to be 72 inches, and the length 56 inches.

$$\begin{array}{r}
 72 \\
 72 \\
 \hline
 144 \\
 504 \\
 \hline
 5184 \text{ square.} \\
 7854 \\
 \hline
 20736 \\
 25920 \\
 41472 \\
 30288 \\
 \hline
 \end{array}
 \qquad
 \begin{array}{r}
 4071,5136 \\
 56 \\
 \hline
 344290816 \\
 303575680 \\
 \hline
 2280047616 \\
 \hline
 \end{array}$$

4071,5136 contents at 1 inch deep.

The above found solid inches 228004 brought into gallons, make 808, and 148 solid inches remain, something above half a gallon; in all 22 barrels, 16 gallons, and  $\frac{1}{2}$  of beer.

Again, Admit the mean diameter of a cask of wine to be 14 inches, and the length 72 inches, what is the contents in wine gallons?

$$\begin{array}{r}
 14 \\
 14 \\
 \hline
 56 \\
 14 \\
 \hline
 196 \\
 \hline
 \end{array}
 \qquad
 \begin{array}{r}
 0,7854 \\
 196 \\
 \hline
 47124 \\
 70685 \\
 7854 \\
 \hline
 153,9384 \\
 72 \\
 \hline
 3078768 \\
 10775688 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 231) 11085.5648 \text{ (47.9)} \\
 \underline{924} \\
 1843 \\
 \underline{1617} \text{ Ans. 48 Gallons nearly.}
 \end{array}$$

$$\begin{array}{r}
 2165 \\
 \underline{2079} \\
 1866 \\
 \text{\&c.}
 \end{array}$$

The content of a Spheriod may be found thus; multiply the square of the shortest diameter by the longest diameter, and then divide by 538 for beer gallons, and by 441 for wine gallons.

Example. Suppose a Spheriod whose shortest diameter is 74 inches, and the longest 125 inches: what is the contents in beer and wine gallons?

$$\begin{array}{r}
 74 \\
 \underline{74} \\
 296 \\
 518 \\
 \hline
 5476 \text{ the square of the shortest diameter} \\
 125 \text{ the longest diameter.}
 \end{array}$$

$$\begin{array}{r}
 27380 \\
 \underline{65712} \\
 538) 684500 \text{ (1272 gallons of beer.} \\
 \underline{538}
 \end{array}$$

$$\begin{array}{r}
 1465, \text{\&c.} \\
 \hline
 (164) \\
 441) 684500 \text{ (1552 gallons of wine} \\
 \underline{441} \\
 2435, \text{\&c.} \\
 \hline
 (68)
 \end{array}$$

To find the contents of the Frustum of a Spheriod: Take twice the square of the bung diameter, add once the square of the head, and multiply that sum by the length: Then for beer



beer divide by 1077, and for wine gallons, divide by 882.

Example. A cask whose bung diameter is 23 inches, head diameter 21 inches, and length 27 inches what is the content in beer and wine gallons?

|     |     |
|-----|-----|
| 23  | 21  |
| 23  | 21  |
| 69  | 21  |
| 46  | 42  |
| 529 | 441 |

add  $\left\{ \begin{array}{l} 529 \\ 529 \\ 441 \end{array} \right\}$  twice the square of the bung diameter,  
once that of the head diameter.

1499  
27 the length.

10493  
2998

1077) 40473 37 (beer gallons:

3231.

8163

7539

(624)

882) 40473 (45 wine gallons.

2528

5193

4410

(783)

## The Construction of some useful Geometrical Problems.

1. At a given Point near the middle of a right line given, to erect a Perpendicular. See figure the 14th.

LET C D be the line given, to have a perpendicular erected on it from the point B; with the compasses (opened at a convenient distance) place one foot at the point B, and with the other make the two marks E and F, on either side of B; then, having the same, or any other more convenient distance in the compasses, set one point on E, and with the other describe the arch G G, which being done, without altering the distance last used, set one foot at F, and with

with the other describe the arch  $HH$ , crossing the former at the point  $A$ ; through which intersection with a ruler draw a line from  $A$  to  $B$ , which will be perpendicular to the line  $CD$ .

2. *How to raise a perpendicular on or near the end of a line.*

This is effected several ways; but I shall instance only two which are very easy.—See figure 15.

*First method.*

Suppose the line  $AB$  be given to raise a perpendicular near the end  $A$ .

First, open your Compasses to any convenient distance and set one foot on the point  $A$ ; and with the other describe the arch  $FED$ ; then, with one foot of the compasses in  $D$ , (they retaining the same distance) cross the arch in  $E$ ; and then setting one foot in  $E$ , with the other make the arch  $AFG$ , crossing the first arch in  $F$ . Again, set one foot in  $F$ , and with the other describe the small arch  $HH$ , crossing the former in the point  $C$ , to the line  $AC$ ; so the line  $AC$  being drawn, will be the perpendicular required.

*The second method.*

Admit  $B$  be the point given on which to draw the perpendicular,  $B1$ . Open the compasses to any convenient distance; and setting one foot on the point  $B$ , pitch down the other foot at random, as suppose at  $K$ ; then the foot resting in  $K$ , turn the other about till it cross the line  $AB$  in  $L$ ; then draw the line  $KL$ , and continue the same beyond  $K$ , setting of the same distance  $KL$ , (at which the compasses already stand) from  $K$  to  $M$ ; so a line drawn from  $B$ , through  $M$ , will be the perpendicular required.

3. *How to divide a right line into two equal parts.* See figure the 16th.

Suppose the line  $AB$  be given to be divided into two equal parts. Take in the compasses any distance above half the length  $AB$ , and setting one foot on the point  $A$ , with the other draw the arch  $FDE$ ; then (with the compasses unaltered) set one foot in  $B$ , and with the other cross the former arch both above and below the line, in the points  $F$  and  $G$ ; then a line drawn from  $F$  to  $G$  shall intersect, or cut the given line in  $H$ , and divide the line  $AB$  into equal parts,  $AH$  and  $HB$ .

4. *A line being given, how to draw another line parrallel thereunto, at any aistance required, or through any point assigned.*

Of parallel lines there are two sorts, viz. straight, or circular. All circles drawn on the same centre, whether greater or lesser ones than the other, are said to be parallel or concentric, that is having one common centre. See figure the 17th.

In this figure the circle A B C D is concentric or parallel to the circle E F G H, because both of them are drawn from the same centre. The line A C is the diameter of the greater circle, and the line E G of the lesser circle. And all right lines drawn from the centre to either of the circumferences, are equal with respect to their periphery; and such lines are called half diameters, and sometimes the radius of the circle, and will divide the circle into 6 equal parts, each containing 60 degrees, and the whole circle 360; into which all the great circles of the sphere are supposed to be divided.

*Of parallel right lines.*

Right lined parrallels, are lines drawn on a plane of equal length and distance; and though infinitely extended will never meet, and in all parts retain an equal distance, such as these underneath.



*To draw a right line parrallel to another right line at a distance given. See figure the 18th.*

Take in your compasses the given distance G H; then setting one foot in E, draw the arch I K; then moving to O describe the arch L M; then laying a ruler on the top of the two arches; just touching them, draw the line N O which will be parrallel to the given line E F.

5. *Through any three points (not in a straight line) to describe a circle. See figure the 19th.*

Let the three points given be A B and C, through which it is required a circle to be drawn. First, set one foot of the compasses in one of the given points, as suppose in A, and extend the other foot to B, another of the points, and draw the arch of a circle G F D; then (the compasses not altered) set one foot in B, and with the other cross the said arch with two small arches, in the points D E; and draw the line D E. Thirdly, set one foot in C, (the compasses being

being at the same distance) and with the other foot cross the first arch  $G F D$  in the points  $F$  and  $O$ , and draw the line  $F G$ , crossing the line  $D E$ , in the point  $O$ , which is the centre sought for; in which place one foot of the compasses, and describe the circle at the distance  $G A$ , and it will pass through all the given points  $A$ ,  $B$ , and  $C$ .

*How to make a line of chords geometrically to any assigned length or radius.*

Since in the art of dialing, there is frequent use made of the line of chords, it is proper here to shew the making thereof.

A line of chords is 90 degrees of the arch of a circle, transferred from the limb of the circle to a straight line; now every circle, whether great or small, is divided (or supposed so to be) into 360 equal parts, called degrees: so the semi, or half circle, contains 180, the quadrant or quarter 90, and the radius or semi-diameter (which is that line with which the circle or semi-circle is drawn or described) is always equal to 60 degrees of that circle which it describes, and therefore 60 degrees of a line of chords is called the radius thereof.

*To make the line of chords: as in figure the 20th.*

First draw a line of any length, as  $C B D$ , and on the middle thereof erect the perpendicular  $A B$ : next open your compasses to the radius or length that you would have your line of chords be of; which admit  $A B$ , and with that distance on  $B$  as the centre, describe or draw the semi-circle  $C A D$ , which is divided into two equal parts or quadrants by the perpendicular line  $A B$ ; thirdly, divide the arch or quadrant  $A D$ , into 90 equal parts or degrees; which is done by taking the length of the line  $A B$ , and setting that distance on the quadrant  $A D$ , and from  $D$  to  $R$ ; so is  $D R$  60 degrees; and  $A R$  30 degrees; then take the distance  $A R$ , and set it from  $D$  to  $S$ , so is the quadrant divided into three equal parts, at the points  $S$  and  $R$ , each containing 30 degrees: This done, divide the several spaces between  $A R$ ,  $R S$ , and  $S D$ , into three equal parts, each of which will contain 10 degrees, according as the numbers are seen and set apart to them: And these again divided into two equal parts, each part contains 5 degrees, and every one of those into 5 smaller, as in the representation; and so the whole quadrant is divided into 90 degrees: fourthly, the quadrant  $A R S D$ , being thus divided into 90 degrees, set one foot of the compasses in  $D$ , and open the foot to  $A$ , and describe the arch  $A E F$ .



A E F, touching the line C D, in F, so is the point F, upon the right line C D, the chord of 90 degrees: fifthly, open the compasses from D to 80 degrees, and describe the arch 80 G H; so shall the point H be the chord of 80 degrees: sixthly, open the compasses from D to 70, describe the arch 70 I K, so is K the chord of 70 degrees. Again, open the compasses from D to R, the radius of 60 degrees, and describe the arch R L B, so is the chord of 60 degrees equal to the radius. Do the same by 50, 40, 30, 20 and 10, and then you will have the line D E divided into 90 unequal parts, called chords as in figure 20.

Thus much for the line of chords frequently made use of in dialling, where there is not the conveniency of having a mathematical instrument maker near at hand.

Note, A degree is the 360th part of the globe, or of any circle, each of which degrees is supposed to be divided into 60 parts, called minutes; so that 45 minutes is three quarters of a degree, and 30 minutes half a degree, and 25 one quarter of a degree.

### Instrumental Arithmetic.

**A**S problems or questions in measurement, &c. are solved or answered arithmetically by the pen, so are they also instrumentally taken by compasses from certain lines, &c. or rules made for that purpose, for the help of those that are deficient in arithmetic, or for a quicker dispatch of business; and such performances are called instrumental arithmetic; and of these instruments the most in vogue or use, are these three; 1. The Carpenter's plain rule. 2. Gunter's line. 3. Cugleshall's sliding rule.

#### *The Carpenter's plain rule.*

I shall describe and say something of the Carpenter's plain rule in relation to its use &c.

#### *Its Description.*

This rule is made use of in measuring boards and timber being two feet in length and divided into twenty-four parts or inches, and every one of those parts or inches subdivided into half inches, and each of these halves into quarters, and each quarter into two parts; so that every inch is divided into eight parts, and the whole length into 192 parts.

This rule is well known, and therefore not absolutely necessary of representation; but however for the better understanding it, I shall give one, thus:

T 2

Under

Under broad measure  
thus described.

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 1 | 7 |
| 0 | 0 | 4 | 3 | 2 | 2 |   |   |
| 0 | 0 | 0 | 0 | 4 | 0 |   |   |

The line begins at six, and goes on to 36, within 4 inches of the rule on the right hand.

*Its Use.*

In deep

Feet. In. Pts.

|               |   |    |   |                                    |
|---------------|---|----|---|------------------------------------|
| If a board be | 1 | 12 | 0 | ) in length make<br>a foot square. |
|               | 2 | 6  | 0 |                                    |
|               | 3 | 4  | 0 |                                    |
|               | 4 | 3  | 0 |                                    |
|               | 5 | 2  | 4 |                                    |
|               | 6 | 2  | 0 |                                    |

By this table it is manifest, and easy understood, that a board of 4 inches requires 3 feet in length to make a foot square, and a piece of 3 inches broad, will require 4 feet in length to make a foot square, &c.

At the other end of this rule is a table, called under timber measure; and thus described.

|    |    |    |   |   |   |    |   |
|----|----|----|---|---|---|----|---|
| 1  | 2  | 3  | 4 | 5 | 6 | 7  | 8 |
| 44 | 36 | 16 | 9 | 5 | 4 | 2  | 2 |
| 0  | 0  | 0  | 0 | 9 | 0 | 11 | 3 |

This line begins at 8 and a half, and goes on (by divisions) to 36.

In. square.

foot.

|                         |   |        |                                   |
|-------------------------|---|--------|-----------------------------------|
| If a piece of timber of | 1 | 144, 0 | ) in length make a<br>solid foot. |
|                         | 2 | 56, 0  |                                   |
|                         | 3 | 16, 0  |                                   |
|                         | 4 | 9, 0   |                                   |
|                         | 5 | 5, 9   |                                   |
|                         | 6 | 4, 0   |                                   |
|                         | 7 | 2, 1   |                                   |
|                         | 8 | 2, 11  |                                   |

By this table it is plain, that if a piece of timber is 6 inches square, then 4 feet in length of that piece will make a solid foot.

It is a common method with carpenters, to add the breadth and thickness of a piece of timber in inches together, and call the half thereof the side of the square of that piece; but this method gives the content more than it is, and the greater the difference, the larger the error. But the true square

square may be found in the Gunter's line, thus: Place one point of the compasses upon the line at the thickness, and the other at the breadth: then half of that extent will reach from either the breadth, or thickness, to the side of the true square in inches.

2. *Gunter's line.*

This line is commonly set on the carpenter's plain rule and consists of two lines numbered 1, 2, 3, &c. one set at the end of the other, and it is somewhat of the following form:

*Gunter's line.*



To prove the line by the compasses, observe that the

Distance from  $\left\{ \begin{array}{l} 1 \text{ to } 2 \\ 5 \text{ to } 10 \\ 4 \text{ to } 8 \end{array} \right\}$  is equal to the distance from  $\left\{ \begin{array}{l} 2 \text{ to } 4 \\ 4 \text{ to } 8 \\ 3 \text{ to } 6 \end{array} \right\}$  &c.

*To number on the Gunter's line.*

Observe that the figures 1, 2, 3, 4, 5, 6, 7, 8, 9, sometimes signify the tens simple or alone; at other times 10, 20, 30, 40, &c. Again, at other times 200, 300, or 1000, &c.

*To find a number on the line, as suppose 134.*

For the figure 1, account one on the line and for 3 take 3 of the large divisions and for 4 take 4 of the smaller divisions; and that is the point. Again, to find 750 on the line; for 7 take 7 on the line, for 50 take 5 of the great divisions, and that is the point.

*To find a small number on the line, as suppose 12.*

For 10, take 1 as before, and for 2 take 2 of the large divisions, and that is the point.

In measuring boards or timber it is best to have a line of 2 foot long, and compasses 1 foot long.

Note let the measurement be by the inch, foot, yard, pole rod, &c. It is best to have it decimally divided, or so supposed, that is, into 10th parts.

Note also, that if one point of the compasses reach beyond the line in the work, remove the other point to the same figure, or place on the other line.

*Multiplication by Gunter's line.*

To multiply 5 by 7, set one foot on the compasses on 1 in

the left hand line, and extend the other to 5 upwards, or towards the right hand, and with the same extent place one foot in 7, and the other foot will fall on 35 in the right hand line, which is the answer.

*Division by Gunter's line.*

Example 1. Divide 63 by 3; Extend from 3 to 1 downwards, or toward the left hand and the extent will reach the same way from 63 to 21 the quotient.

N. B. In multiplying you must always extend upwards, that is from 1 to 2, 3, 4, &c. and on the contrary in dividing extend downwards.

Example 2. Divide 288l. equally among 16 men? Extend from 16 to 1 downward; and that extent will reach the same way, from 288l. to 18l. for each man.

Again.

Example 3. Suppose 750l. were to be divided among 25 men; Extend from 25 to 1 downwards; and that extent will reach the same way, from 750 to 30l. each man's share.

*Rule of Three direct.*

Example 1. If five bushels of barley cost 11 shillings, what will 40 bushels cost? Extend from 5 to 11 upwards; and that extent will reach the same way, from 0 to 88, the shillings required.

Example 2. If 3 ells of holland cost 10s. 6d. what will 40 ells cost? Extend from 3 to 19½ upwards; and that extent, the same way, will reach from 40 to 140s. the answer.

*The Use in board measure.*

Example. If a board be 9 inches broad, and 19 feet long what is the content in superficial square feet? Extend from 12, (the centre of foot measure) to 9 downwards, and that extent, the same way, will reach from 19 to 14 and ½.

*In Timber Measure.*

Example. A piece of timber 24 inches square, and 8 feet long, what is the content in solid feet? Extend from 12 the centre, to 24 upwards, and that extent twice the same way will reach from 8 to 32 feet the content.

*Brick work.*

How many rods of work are there in 4085 feet? Extended from 272 downward to 2 and that extent, the same way, from 4085, will reach to 15 rods, the answer.

3. Coggle-



3. *Coggleshal's sliding rule.*

The next instrument I shall speak of, is that which goes by the name of *Coggleshal's sliding rule*. And first of

*Its Description.*

This rule is framed three ways; sliding by one another, as the glaziers rule; sliding on one side of a two foot joint rule; and one part sliding on the other, in a foot of length; the back part being flat, on which are sundry lines and scales.

Upon the aforesaid sliding side of the rule, are four lines of numbers, three are double lines, and one a single line of numbers marked with A B C and D, the three marked A B C and D, are called double lines of numbers, and figured 1, 2, 3, 4, 5, 6, 7, 8, 9. Then 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10, at the end. That marked D, is the single line of numbers, and figured 4, 5, 6, 7, 8, 9, 10, 20, 30, and at the end 40 even with and under 10, in the double line next to it, and that is called the girt line, and so marked in the figure.

The figures on the three double lines of numbers may be increased or decreased at pleasure; thus 1 at the beginning is 10, 100, or 1000, the 2 is 20, 200, or 2000; so that when 1 is at the beginning is 10, the one on the middle is 100 and 10 at the end is 1000; but if one at the beginning is counted for 1, then 1 in the middle is 10; and 10 at the end is 10.

And as the figures are altered, so must the strokes or divisions between them be altered in their value, according to the number of parts they are divided into; as thus, from 1 to 2 it is divided into ten parts, and each tenth is divided into 5 parts; and from 2 to 3, it is divided into 10 parts, and each tenth into 2 parts, and so on from 3 to 5; then from 5 to 6, it is divided into 10 parts only; and so on unto 1 in the middle of the rule, or the end of the first part of the double line of numbers. The second part of the double line is divided like the first.

The girt line marked D is divided from 4 to 5 into 10 parts and each tenth into 2 parts, and so on from 5 to 10 and then from 10 to 20 it is divided into ten parts, and each tenth into 4 parts, and so on all the way from 20 to 40 at the end; which is right against 10 at the end of the double lines of numbers.

The lines on the back-side of this rule that slides on one side, are these, viz, a line of the inch measure, from 1 to 12 each divided into halves, quarters and half quarters; another line

line of inch measure from one to 12, each divided into 12 equal parts, and a line of foot measure, being 1 foot divided into 100 equal parts, and figured 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100 even with 12 on inch measure.

And the back side of the sliding pieces divided into inches, halves, quarters, and half quarters, and figured from 11 to 24, so that it may slide to 2 feet, to measure the length of a tree or any thing else you have occasion to measure.

*The use of the double scale.*

**Examples.** Suppose there is a geometrical square, whose sides are 3 feet  $\frac{1}{4}$  each: set 1 foot on the line B, to 3  $\frac{1}{4}$  on the line A; and then against 3  $\frac{1}{4}$  on the line B, is 12  $\frac{1}{4}$  feet on the line A, which is the content of such a square.

F. Pts.

|    |   |   |                 |
|----|---|---|-----------------|
| 3  | 6 | } | Arithmetically. |
|    | 3 |   |                 |
|    | 6 |   |                 |
| 10 | 6 |   |                 |
| 1  | 9 |   |                 |

12 3

Proof.

Suppose the side of a rhombus to be 8 feet 6  $\frac{1}{2}$  inches, and the breadth or line A B, 8 f. 4  $\frac{1}{2}$ , what is the content? Set one foot on the line B, to 8  $\frac{1}{8}$  feet on the line A, then against 8  $\frac{1}{8}$  feet on the line B, is 71 feet  $\frac{4}{8}$  parts of a foot on the line A; and to know the value of a decimal, or part of the foot, look for  $\frac{4}{8}$  on the rule, and you will find against it 4  $\frac{1}{2}$  inches, so that the content of this rhombus is 71 feet 4  $\frac{1}{2}$  inches.

Again suppose the length of a rhomboides to be 17 f. 3 or 17  $\frac{3}{8}$  and the breadth 8 f. 7 or  $\frac{1}{8}$ , what is the content? Set one foot on the line B to 17,25 on the line A, then against 8,58 on the line B, 148 feet on the line A. The figure hath been represented before, and operated arithmetically, therefore it is here unnecessary.

Let the base of a triangle be 4 feet 1 inch  $\frac{1}{2}$ , and the perpendicular 2 feet 1  $\frac{1}{2}$ : The half of the one is 2 feet 17 parts and of the other 1 foot 7 parts. Set one on the line B, to 4,15 on the line A; then against 1,07 half the perpendicular on the line B, is 4 feet and almost  $\frac{1}{4}$  a foot for the content. Or if you set 1 on the line B, to 1,07 on the line A, against 4,15 on the line B, is 4, and almost  $\frac{1}{4}$  a foot on the line A.

Again another way. If you set one on the line B to 4,1 on the line A, then against 2,15 on the line B is 8 feet  $\frac{1}{8}$  in ch.

(which is about 11 inches) on the A, the half whereof is 4 feet 5 inches  $\frac{1}{2}$  which is the content of the triangle.

## GEOGRAPHY.

**G**EOGRAPHY is the art of describing the figure, magnitude, and position, of the surface of the earth, and seas, and their parts.

Many and sufficient arguments may be produced to prove that the earth and seas are of a spherical or globular figure, one of them may be sufficient in this place, viz. that ships, in sailing from high capes or head-lands, lose sight of their lower parts first; and continue gradually to lose sight of those which are situate higher and higher, till at last the top vanishes; which could not be, unless the surface of the sea was convex: now this convexity of the sea is found to be uniform in all parts thereof, therefore the surface of the water is spherical; which being granted, that of the land must be nearly so, because its extremity sets limits to the water.

The whole body of the earth and sea is therefore called the *terraqeous globe*,

Since, as has been before observed, all circles are divided into 360 degrees, therefore any great circle surrounding the *terraqeous globe*, is usually so divided. Our ingenious countryman Mr Richard Norwood, about the year 1635, by an accurate measurement of the distance between London and York, found that a degree or a great circle was about 69 one-half statute miles in length and consequently that the circumference of the *terraqeous globe* was 25020 miles; whence its diameter will be 7264 miles.

The sea covers the greater part of the *terraqeous globe*, out of which the land rises with very few ascents, the height of the loftiest mountains thereof being hardly the four thousandth part of the above found diameter, which is but just sufficient to give the rivers a slow and easy descent.

Geographers have found it necessary to imagine certain circles to be drawn on the surface of the earth, for the better determination of the positions of places thereon.

These are either greater or lesser circles; great circles divide the globe into two equal parts, the lesser circles divide it into two unequal parts.

There are six kinds of great circles; two of them, viz. the equator or equinoctial and the ecliptic are fixed: but the others, viz. the meridians, the circles of longitude, the horizons,

zons, and the vertical circles, are variable according to the part of the globe they are appropriated to.

There are two points on the surface of the terraqueous globe, called the Poles of the earth, which are diametrically opposite to each other; the one is called the north and the other the south pole.

The equator is that great circle which is equally distant from both the above mentioned poles, and is so called, from its dividing the terraqueous globe into two equal parts; namely, from the poles that are situated in each, the northern and southern hemispheres: it is also called equinoctial, because, when the sun enters it, the days and nights are of equal length in all parts of the globe: seamen commonly call this circle the Line.

Meridians, or circles of terrestrial longitude, are supposed to be drawn perpendicular to the equator, and to pass through the poles; they are called meridians, or mid-day circles, because when the sun comes to the meridian of any place, it is noon or mid-day at that place.

Hence every particular place on the surface of the terraqueous globe hath its proper meridian, and consequently a traveller, who doth not directly approach or recede from one of the poles, is continually changing his meridian.

With respect to the two circles above described, every place upon the earth is said to have its particular latitude and longitude.

The latitude of any place upon earth is its distance from the equator, in a direct line towards one of the poles; and since the meridians proceed in such direct lines, therefore latitude is reckoned in degrees, and parts of degrees, on the meridian of the place.

The longitude of any place upon earth is the east or west distance of the meridian of that place, from some fixed meridian, at which longitude is supposed to begin. Now since all the meridians pass through the poles, they coincide with one another at those points, and their greatest distance from each other will be, when they are farthest from those points of coincidence, viz. at the equator: therefore longitude is reckoned in degrees and parts of a degree in the equator.

Geographers have differed very much in the meridian, from whence they have assumed the beginning of longitude; the ancients chose the meridian of the Canaries, which they called the Fortunate Islands; others have pitched on the islands Azores, or the Western Islands; but the most usual way now is to reckon longitude from the capital of that country in which



which the author writes; and accordingly the longitude hereafter reckoned from the meridian of London.

Parallels of latitude are small circles drawn parallel to the equator at any assigned distance therefrom, therefore every particular place on the surface of the terraqueous globe hath its proper parallel of latitude.

There are four of these parallels of latitude that are particularly remarkable, viz. the two tropics and the two polar circles; but for the better explanation of their properties, it will be necessary, first, to define the ecliptic.

The ecliptic is the great circle in which the sun seems to perform its annual motion round the earth; this circle makes an angle with the equator of 23 deg. 92 min: It intersects it in two opposite points, called the equinoctial points; and those two points in the ecliptic which are farthest from the equinoctial points are called the solstitial points.

The tropic of Cancer is a parallel of latitude 23 deg. 29 min. distant from the equator in the northern hemisphere, passing through the northern solstitial point of the ecliptic above described: And,

The tropic of capricorn is a parallel of latitude as far distant in the southern hemisphere, passing through the southern solstitial point.

The arctic polar circle is a parallel of latitude, 23 deg. 29 min. distant from the north pole: and the Antarctic polar circle is a parallel of latitude, as far distant from the south pole.

The tropics and polar circles divide the globe into five parts called Zones; that is to say, girdles or bolts; one of them is called the Torrid; two temperate, and two Frigid.

The Torrid Zone, so called from the great heat of the Sun, (which is vertical, or passes directly over the heads of the inhabitants twice in a year) is situated between the two tropics, and is therefore about 47 deg in breadth: the inhabitants are called Amphysicians, that is, such as have their shadows cast both ways; the Sun being seen at noon sometimes to the north, and at other times to the south of them.

The northern Temperate Zone is situated between the tropic of Cancer and the Arctic polar circle; and the Southern Temperate Zone, between the tropic of Capricorn and the Antarctic polar circle: they are each of them about 43 deg. broad; the inhabitants are called Heteroscians, that is such as have their shadow but one way; for at noon the shadows of the inhabitants of the northern Temperate Zone are always cast

east northward : and those of the inhabitants of the Southern southward,

The Frigid Zones contain all that space between the polar circles and the poles themselves; the northern Frigid Zone, being surrounded by the Arctic circle, and the Southern by the Antarctic; the inhabitants are called Periscians, because (when the Sun is on the same side of the equator as those inhabitants are) their shadows are, in the space of 24 hours, cast off all sides, or quite round them. The sun does not set in the place within these two Zones, during several successive revolutions or days in the Summer; and in the winter he doth not rise for a like space of time: At the poles themselves the sun is visible for half of the year, and invisible for the other half.

If any place on the globe (except the poles and equator) be particularly considered, there will be three other places on the same meridian, which have more immediately a relation thereto, viz, 1 That place which has the same latitude on the other side of the equator: the inhabitants of this place are called Antæci or Antæcians; they have mid-day and mid-night at the same time with those of the place assumed, but the seasons of the year different, the Summer of the one being the winter of the other:

2. That place, which is on the same parallel of latitude, but is 180 degrees different in longitude; the inhabitants of this place are called Perizæci or Perizæcians; they have summer and winter at the same times with those of the place assumed, but the times of the day are different, the mid-day of the one being the midnight of the other.

3. That place which has the same latitude, on the other side of the equator, and is 180 degrees different in longitude; this place is diametrically opposite to the place assumed; its inhabitants are called Antipodes, and their seasons of the year, as well as times of the day, are totally opposites.

The Horizon is that great circle which divides the upper or visible hemisphere of the world, from the lower or invisible; the eye of the spectator being always in the centre of his horizon: hence every particular place on the terraqueous globe hath a different horizon; and consequently a traveller, proceeding in any direction, is continually changing his horizon.

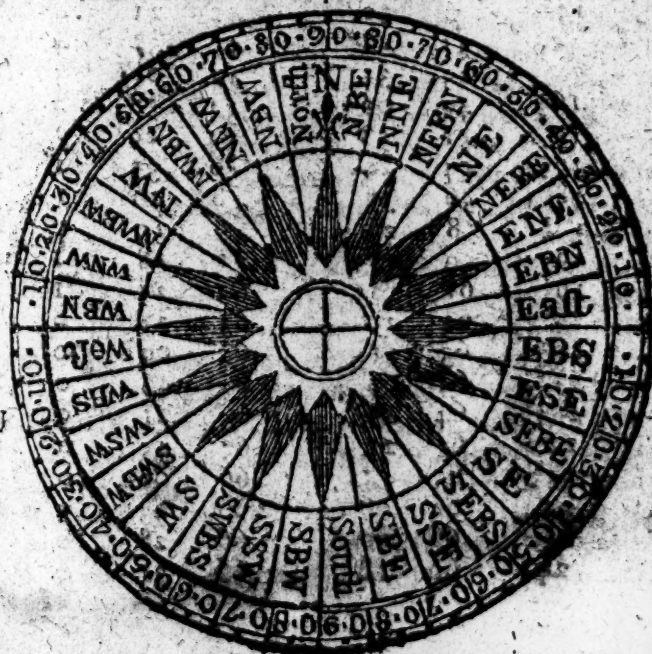
The circle is by mariners, divided into four quarters containing 90 degrees; the four points quartering this circle are called Cardinal points, and are named East, West, North, and South; the east and west are those points on which the sun rises and sets when he is in the equinoctial; and the north  
and

and south points are those which coincide with the meridian of the place, and are directed toward the north and south poles of the world.

Each quarter of the horizon is farther divided into eight points, which are very necessary to the Geographer, for the distinguishing the limits of countries; but the use of these divisions is much more considerable when applied to the Mariner's Compass.

Before the invention of this excellent and most useful instrument, it was usual in long voyages to sail by, or keep along the coast, or at least to have it in sight; as is manifest and plainly evident by the voyages of St. Paul, Acts xx. 13. and xxvii. 2. which made their voyages long and very dangerous, by being so near the shore. But now by the help of a needle, touched by the magnet or load stone, which by a wonderful and hidden quality inclines its point always northerly, the ingenious mariner is directed in his proper course of sailing through the vast ocean and unfathomable deeps, to his intended port: and if the wind be favourable, can sail near 333 leagues, or 1000 miles in a week, though in the darkest weather, or darkest night; when neither land, moon nor stars are to be seen, which were before the only guide, and if not seen, the sailors were at a great loss, and exposed to the most imminent danger.

Behold the figure or representation of the said Compass with the Cardinal and other points.



The

The compass is a representation of the horizon on a circular piece of paper called a Card, which card being properly fixed to a piece of steel, called the Needle, and placed so as to turn freely round a pin that supports it, will shew the position of the meridian and other points, and consequently towards which of them the ships sail.

Note, The letters NBE, NNE, NEBN, &c. are to be read North by East, North North East, North East by North &c.

A Climate is a space of the terraqueous globe contained between two such parallels of latitude, that the length of the longest day in the one exceeds that in the other by half an hour.

There are 60 climates, 30 to the north, and 30 to the south of the equator: 24 of each 30 being situate between the equator and polar circle, differ in the length of their longest day by 24 hours; but in the remaining 6 between the polar circles and the poles, the differences of the length of the longest days are each a month.

*Table of the Climates between the Equator and the Polar Circles.*

| Climate. | Longest | Begins    |      | Ends      |      | Breadth. |      |
|----------|---------|-----------|------|-----------|------|----------|------|
|          | Day.    | Latitude. |      | Latitude. |      | Breadth. |      |
|          | hour,   | deg.      | min. | deg.      | min. | deg.     | min. |
| 1        | 12½     | 0         | 0    | 8         | 34   | 8        | 34   |
| 2        | 13      | 8         | 34   | 16        | 43   | 8        | 09   |
| 3        | 13½     | 16        | 43   | 24        | 11   | 7        | 28   |
| 4        | 14      | 24        | 11   | 30        | 45   | 6        | 34   |
| 5        | 14½     | 30        | 45   | 35        | 30   | 5        | 45   |
| 6        | 15      | 36        | 30   | 41        | 22   | 4        | 52   |
| 7        | 15½     | 41        | 22   | 45        | 31   | 4        | 09   |
| 8        | 16      | 45        | 31   | 49        | 01   | 3        | 30   |
| 9        | 16½     | 49        | 01   | 51        | 58   | 2        | 57   |
| 10       | 17      | 51        | 58   | 54        | 29   | 2        | 31   |
| 11       | 17½     | 54        | 29   | 56        | 37   | 2        | 08   |
| 12       | 18      | 56        | 37   | 58        | 26   | 1        | 49   |
| 13       | 18½     | 58        | 26   | 59        | 59   | 1        | 33   |
| 14       | 19      | 59        | 59   | 61        | 18   | 1        | 19   |
| 15       | 19½     | 61        | 18   | 62        | 25   | 1        | 07   |
| 16       | 20      | 62        | 25   | 63        | 21   | 0        | 56   |
| 17       | 20½     | 63        | 21   | 64        | 09   | 0        | 48   |
| 18       | 21      | 64        | 09   | 64        | 49   | 0        | 40   |
| 19       | 21½     | 64        | 49   | 65        | 21   | 0        | 32   |
| 20       | 22      | 65        | 21   | 65        | 45   | 0        | 24   |
| 21       | 22½     | 65        | 45   | 66        | 06   | 0        | 12   |
| 22       | 23      | 66        | 06   | 66        | 23   | 0        | 14   |
| 23       | 23½     | 66        | 20   | 66        | 28   | 0        | 08   |
| 24       | 24      | 66        | 28   | 66        | 34   | 0        | 04   |



Table of the Climates between the Polar Circles and the Poles.

|    | mon. | deg. | min. | deg. | min. | deg. | min. |
|----|------|------|------|------|------|------|------|
| 25 | 1    | 66   | 31   | 67   | 21   | 0    | 50   |
| 26 | 2    | 97   | 21   | 69   | 48   | 2    | 27   |
| 27 | 3    | 69   | 48   | 73   | 37   | 3    | 49   |
| 28 | 4    | 73   | 37   | 78   | 30   | 4    | 53   |
| 29 | 5    | 78   | 30   | 84   | 05   | 5    | 35   |
| 30 | 6    | 84   | 05   | 90   | 00   | 5    | 55   |

The terraqueous globe, or globe of the earth and waters is divided, by nature, into continents, islands, peninsulas, isthmus's, mountains, promontaries or capes, hills and valleys, oceans, seas, lakes, gulphs or bays, straits, ports or harbours and rivers; rocks, shelves, banks, marshes, and bogs.

A continent, called sometimes the main land, is a large tract of land, containing several contiguous countries, empires, kingdoms, or states.

An island is a piece of land wholly surrounded by the ocean, sea, or other water, and so divided from the continent.

A peninsula (that is to say *almost an island*) is a piece of land encompassed by water, except on one side where it is joined to the continent or other land.

An isthmus is that neck or narrow piece of land that joins a peninsula to the continent.

A mountain is a part of the earth which is considerably higher and more elevated than other lands near it.

A promontory is a mountain running out into the Sea, the extremity of which is called a cape or headland.

A hill is a lesser kind of mountain, and a valley is that land which is situate at the bottom of a mountain or hill, or between two or more such.

The ocean is a vast body of salt water, which separates some of the continents, and washes their borders or shores.

A sea is a branch of the ocean flowing between some parts of the continents or separating islands from them.

A lake is a body of waters every where surrounded by the land.

A gulph or bay is a part of the ocean or sea contained between two shores, and is encompassed by the land except on one side, where it communicates with the other waters.

A strait is a narrow passage, whereby seas, gulphs, and bays, communicate with the ocean, or with one another.

A port or harbour is part of the ocean or sea so inclosed by land, that ships may ride in safety therein.

A river is a running water, descending in a narrow channel from the mountains or other high lands, and emptying itself into some ocean, sea, lake, or other river.

Rocks, are great stones; shelves and banks, are eminences consisting of stones, sand, or other matter which obstruct the passage of ships at sea, and often prove fatal to those who do not keep clear of them.

Marshes are lands lying low, which are liable to be overflowed by the sea or rivers, and bogs are mixtures of land and water, over or among which it is dangerous to attempt a passage.

The known parts of the earth are commonly divided into four parts; viz. Europe, Asia, Africa, and America; the three first were known to the Ancients, and are for that reason called the Old World: the fourth was discovered about 300 years ago and is therefore called the new world.

The lands which lie toward the north and south poles are very little known; that toward the north poles is called Terra Arctica, and that toward the south poles Terra Antarctica, or Terra Australis incognita; the latter is supposed, by some, to be nearly as big as Europe, Asia, and Africa.

The ocean assumes different names, in different parts of the earth; and the seas, gulphs, and bays, are named, mostly, from the lands to which they adjoin: it is thought therefore most convenient in this short sketch, to describe the lands and waters together; and first of

## EUROPE,

### *And the adjacent Waters.*

EUROPE is bounded on the north, by the northern, or frozen ocean; on the west by the north Atlantic or western ocean, which separates it from America; on the South, by the Mediterranean sea, separating it from Africa; and, on the east by Asia, to which it joins, without any visible limit, towards the northern parts; but on the Southern, the river Tanais, the Palus Meotis, or sea Della Zabache, the streights of Caffa, the Euxine, or black sea, the streights of Constantinople, the sea of Marmara, the streights of the Dardanelles, and the Archipelago, serve to separate them.

The dimensions of Europe may be partly conceived by the measures following; Constantinople, the Capital of Turkey, (situate in latitude 41 deg 00 min. N. longitude 28 deg 58 min. East,) bears from Cape St Vincent, the south-west point of land in Portugal, (situate in lat. 36 deg. 41 min. N.

long.

long. 8 deg. 12 min. W.) N. 81 deg. 48 min. E. being 177 geographical miles \* distant therefrom.

Cape Mala, the southern point of Turkey (in lat. 37 deg. 20 min. N. long 24 deg. 07 min. E.) bears from the north cape (in lat. 71 deg. 27 min. N. long. 26 deg. 30 min. E. S. 2 deg. 15 min. W. distance 2058 miles.

Europe contains the following empires, kingdoms, regions or states, viz. Spain, Portugal, France, Italy, Turkey, Great Britain, the Netherlands, Germany, Hungary, Poland, Denmark, Sweden, and Muscovy.

### *Of SPAIN and PORTUGAL.*

SPAIN and PORTUGAL are surrounded by the sea on three sides ; on the south and south east by the Mediterranean, which communicates with the western, or Atlantic ocean by the streights of Gibraltar ; on the west, by the said ocean ; and on the north, by the same or a part thereof, called the Bay of Biscay ; On the north east by the Pyrenean mountains, which (reaching from the Mediterranean to the Bay of Biscay) separate it from France.

Portugal is now a kingdom, separated from Spain, to which it was heretofore subject ; it is situate on the ocean, which washes it on the west and south : it has Galicia on the north ; and borders upon Leon, Old Castile, New Castile, and Andalusia on the west pole is hardly 300 miles in length from north to south, and about 100 in breadth : the capital city, is Lisbon, which is now in a ruinous condition, being almost totally destroyed by an earthquake, and a fire which succeeded it in November 1765 ; the city of Oporto is also a place of great trade.

Most of the other provinces of Spain were also formerly separate kingdoms ; such were Andalusia, in which Gibraltar is situated, as are the cities of Seville and Cadiz ; Grenada, within the streights the principal city has the same name : and on the Mediterranean are situated the ports of Malaga, and Almeria ; Murcia more eastward in the Mediterranean, in which, besides a city of the same name, is the city and port of Carthagena ; Valencia, north eastward of Murcia, this has a city and a sea port of the same name, and another port of great trade called Alicant.

In the inland parts are the kingdoms of Old Castile, New Castile, and Leon ; and near the confines of France, those of

U 3

Aragon

\* Geographical miles may be reduced to English miles by adding to their number one sixth of the same, thus 1700 geographical miles are equal to 2000 and 283, or 1983, English miles.

Arragon and Navarre; the principal cities of Old Castile are Burgos and Valladolid; of New Castile, Madrid, the king's residence, and Toledo; of Leon, Salamanca and Leon; of Arragon, Saragossa; and of Navarre, Pampelona, and Estella.

The kingdom of Galicia is situate on the ocean, in the north-west part of Spain; its principal cities are Compostella, and Corunna, on the Groyne, which is a sea port; the principality of Asturias gives title to the king of Spain's eldest son, it is situated eastward in the Bay of Biscay; the principal city is called Oviedo; the province of Biscay, still more eastward, lies on the bay of that name, and has two ports of consequence, Bilboa, and St. Sebastian.

Lastly, The principality of Catalonia is situate on the Mediterranean, and is the most eastern province of Spain; in this is the city and port of Barcelona, which is not inferior to any of the above named. Not far from which are the Balearic isles, called Majorca, Minorca, and Ivica.

Proceeding eastward, along the Mediterranean sea, is the kingdom of France, which is bounded on the east by Italy and Germany, on the north by the Netherlands and the English channel, on the west by the Bay of Biscay, and on the south by the Pyrenees, which separate it from Spain, and part of the Mediterranean sea.

France consists of twelve provinces, the southern are Guienne and Gascony, whose chief town is Bourdeaux; Languedoc, whose capital is Tholouse; Dauphiny, whose principal city is Grenoble; and Province, whose capital is Aix; this province has two very considerable sea-ports, called Toulon and Marseilles.

More northerly are the provinces of Bretagne, Orleanois, Burgoine, and Lionois; whose capitals are Rennes, Orleans, Dijon, and Lyons; and still more northward are Normandy, the isle of France, Champagne, and Picardy, whose chief towns are Rouen, Paris, (the capital of the kingdom), Troyes and Amiens.

Although the provinces of France have not the superb titles of kingdoms, as those of Spain have, yet some of them are more extensive, rich, and populous, than some of those kingdoms.

Italy is divided from France on the west by the river Var and part of the Alps; from Germany on the north, by the same mountains called the Alps; and is every where else surrounded by the Mediterranean sea and the gulph of Venice, which is a branch thereof.



This country is divided into a great many territories, governed in different manners.

The duchedom of Savoy, situated partly among the Alps, the Capital of which is Chambery; and the principality of Piedmont, whose capital is Turin, are subject to the king of Sardinia; the duchess of Milan and Mantua, whose capitals bear the same names, are subject to the queen of Hungary; the duchy of Montserrat, whose capital is called Cassal, and those of Parma and Modena, having capitals of the same name, are governed by their own dukes. Venice, Genoa, Lucca, and S. Marino, are the capitals of the four republics called by those names: Trent is governed by its bishop: Rome and its dependencies by the Pope; the grand duchy of Tuscany (the capital of which is Florence) is subject to the present Emperor of Germany, and Naples, the capital of a kingdom, situate at the southern extremity; together with the island of Sicily, from which it is divided by a narrow strait, are subject to the same king. The chief city of Sicily is called Palermo.

There are two other large islands, Sardinia (whose capital is Cagliari) subject to this king, and Corsica (whose capital is Bastia) at present subject to France; also a small one to the south of Sicily called Malta, subject to the knights of Malta.

More to the eastward is Turkey in Europe, which consists of many provinces. Constantinople, in the eastern part thereof being the residence of the Grand-Seignior, the sovereign of this empire.

The names of those provinces and their capital cities follow,

| <i>Provinces.</i> | <i>Chief cities,</i> |
|-------------------|----------------------|
| Dalmatia,         | Spalatro,            |
| Bosnia,           | Belgrade,            |
| Servia,           | Semandria,           |
| Transilva,        | Hermanstat,          |
| Walachia,         | Tergowie,            |
| Moldavia,         | Zaczow,              |
| Bulgaria,         | Sophia,              |
| Crim Tartary,     | Precop,              |
| Romania,          | Constantinople,      |
| Grecia,           | Salonica.            |

To these must be added the islands of the Archipelago, which are very numerous.

Great Britain is a large island, having divers lesser ones dependent on it; it consisted a few years ago of two distinct kingdoms (under one sovereign) called England and Scotland.

land; and as this work is published in the former of them, it is thought convenient to be more particular in the description thereof, than we are with regard to other countries, we shall therefore give the following.

*An Account of the several Counties of England and Wales, with their Produce, Market towns, and Market days, &c.*

Note, *m* stands for Monday, *tu* for Tuesday, *w* for Wednesday, *th* for Thursday, *f* for Friday, and *s* for Saturday.

*Berkshire.*

**I**S supposed to contain about 527,000 acres, it is 120 miles in circumference; hath plenty of corn, cattle, wool, and wood (especially oak,) and is accommodated with water carriage, by the very fine rivers of Thames and Kennet.

*And bath these Market towns, viz.*

Reading the shire town, market day on Saturday.

Abingdon, *m* and *f*

Windsor, *s*

Wallingford, *tu* and *f*

Maidenhead, *w*

Hungerford, *w*

Newberry, *th*

Farringdon, *tu*

Wantage, *s*

East Isley, *w*

Oakingham, *th*

*Buckinghamshire.*

Is an inland county as well as Berkshire; it contains about 441,000 acres, is 183 miles in circumference, abounds in corn and cattle, and is very considerable for wool. The principal rivers in this shire are Tame, Ouse, and Coln.

*Market towns.*

Buckingham, *f*

Aylesbury, *s*

High Wickham, *f*

Marlow, *s*

Stony Stratford, *f*

Oundle, *m*

Beaconsfield, *s*

Chesham, *w*

Wendover, *th*

Amersham, *tu*

Newport Pagnel, *s*

Colebrooke, *w*

Risborough, *f*

Ivingho, *f*

Winslow, *tu*

*Bedfordshire.*

Contains about 260,000 acres, is 73 miles in circumference, well stored with corn and cattle, and famous for fuller's earth, &c,

*Market towns.*

Bedford

Bedford, *tb*, and *f*  
 Dunstable, *to*  
 Wooburn, *f*  
 Ampton hill, *tb*  
 Leighton, *m*

Lutton, *m*  
 Shefford, *f*  
 Biggleswade, *tb*  
 Potton, *s*  
 Tuddington, *s*

*Cambridgeshire.*

Is an inland county, contains about 570 000 acres, is 130 miles in circumference, and affords plenty of corn, cattle and wild fowl. Cambridge is the shire town, and remarkable for a famous university, containing 12 colleges, and 4 halls, all well endowed, and are as followeth, viz.

*Colleges,*

*By whom founded.*

*When founded*

|                        |                                        |
|------------------------|----------------------------------------|
| 1284 Peterhouse,       | by Hugh de Bathon, Bp. of Ely.         |
| 1346 Corpus Christi    | by Henry of Monmouth, Duke of          |
| or Bennet;             | Lancaster.                             |
| 1348 Gonvil and Caius, | so called from its several founders.   |
| 1441 King's            | by King Henry VI.                      |
| 1648 Queen's,          | by Margaret his queen.                 |
| 1497 Jesus,            | by J. Alcocke, L. L. D. Bp. of Ely.    |
| 1506 Christ's,         | }                                      |
| 1506 St John's         |                                        |
| 1542 Magdalen,         | by Edward Stafford, duke of Bucking.   |
| 1546 Trinity,          | by king Henry VIII.                    |
| 1584 Emmanuel,         | by Sir Walter Mildmay.                 |
| 1598 Sidney Sussex,    | by Francis Sidney, countess of Sussex. |

*Halls*

|                 |                                  |
|-----------------|----------------------------------|
| 1343 Clare,     | by Richard Badew,                |
| 1347 Pembroke,  | by Mary, countess of Pembroke,   |
| 1343 Trinity,   | by W. Bateman, Bishop of Norwich |
| 1549 Catharine, | by Robert Wood, the Chancellor   |

*Market towns.*

Cambridge, *f*

Ely, *tu*

Caxton, *tu*

Linton, *tb*

New-market, *tu*

Merche, *f*

Wisbech, *s*

Royston, *w*

Soham, *s*

*Cheshire.*

Is a maritime or sea county, containing 720,000 acres, and is in circumference about 118 miles. Cheese and salt are the principal commodities; for the first, no place in the world equals it; and for the latter, if there was but a sufficient

cient quantity made, there would be no occasion for voyages to the Isle of Man.

*Market towns.*

Chester, *w* and *s*  
 Congleton, *s*  
 Nantwich, *f*  
 Middlewich, *s*  
 Norwich, *f*  
 Macclesfield, *m*

Frodsham, *w*  
 Stockport, *f*  
 Sandwich, *tb*  
 Altringham, *tu*  
 Malpas, *m*  
 Knutsford, *f*

*Cornwall.*

Is a maritime county, in the most western part of the kingdom containing 900,000 acres, and is 156 miles in circumference. The chiefest commodities are tin and copper, particularly the former; it also affords great plenty of wild fowl, especially woodcocks, in the season; it likewise yields great quantities of sapphire, eringo, fine slate and marble; above all the rest, vast quantities of fish, which are yearly exported to France, Spain, and other foreign countries.

*Market towns.*

Launceston, the chief town *f*  
 Lescard, *s*  
 Lestwithel, *f*  
 Truro, *w* and *f*  
 Bodmin, *s*  
 Helston, *s*  
 Penzance, *tb*  
 Fowey, *s*  
 St Germain, *f*

Padstow, *s*  
 Cachelford, *f*  
 Grampond, *s*  
 Penryn, *w, f, s*  
 Trigon, *s*  
 St Ives, *w* and *f*  
 St Columbe, *tb*  
 Falmouth, *tb*  
 Market-jew, *tb*

*Cumberland.*

Is also a maritime county, bounded northward with Scotland, and westward with the Irish sea: It contains about 1,040,000 acres, and is in circumference 168 miles; it is a fruitful country, affording good pasture on the hills, and good corn in plenty in the valleys; fish and wild fowl are very plentiful, and coals in abundance; likewise large mines of lead and copper, which are both very good in their kind.

*Market towns.*

Carlisle is the chief, *s*  
 Cockermouth, *tu*  
 Whitehaven, *tb*  
 Penrith, *tu*  
 Keswick, *s*  
 Brampton, *tu*

Holm, *s*  
 Egremont, *s*  
 Kirke, Oswald, *tb*  
 Longtown, *tb*  
 Ravenglass, *s*  
 Wigton, *tu*

*Darby.*



Derbysbire.

Is an inland county, 130 miles in circumference, and contains about 680,000 acres, affords great store of corn and wood, likewise considerable quantities of freestone and marble, coal and lead mines in abundance; also it yields crystal and alabaster.

Market towns.

|                             |               |
|-----------------------------|---------------|
| The county town is Derby, s | Alfreton, m   |
| Chesterfield, s             | Bakewell, m   |
| Wirksworth, tu              | Dronsfild, tb |
| Bolsover, f                 | Fiddlewell, w |
| Ashburn, f                  |               |

Devonsbire.

Is a maritime county, about 200 miles in circumference, and contains near 1,920,000 acres; it lies on the west of England, and joints to Cornwall, having the sea on the north and south: it affords great plenty of corn, wool, fowl, fish, and also lead and tin mines: but the principal manufactures are kerseys, serges, and lace.

Market towns.

|                                |                |
|--------------------------------|----------------|
| Exeter is the capital, w and s | Honiton, s     |
| Barnstaple, f                  | Oakhampton, f  |
| Plympton, s                    | Axminster, s   |
| Tavistock, s                   | Culliton,      |
| Tiverton, tu                   | Dodbrook, w    |
| Plymouth, m and f              | Autrey, tu     |
| Totness, s                     | Cudee, s       |
| Ashburton, f                   | Hatherleio, tu |
| Bideford, tb                   | Moreton, s     |
| Torrington, s                  | Kingsbridge, f |

Dorsetsbire.

Is a country exceeding pleasant and fruitful, and lies open to the channel, being 150 miles in circumference, and contains about 772,000 acres, yielding great plenty of corn, cattle, wool, fish, and wild fowl; and it also affords abundance of hemp, freestone, and marble.

Market towns.

|                                  |                |
|----------------------------------|----------------|
| Dorchester is the county-town, s | Cranbron, w    |
| Weymouth, tu and f               | Blandford, s   |
| Milcom Regis, tu and f           | Abbotsbury, tb |
|                                  | Cerne, w       |

Shaft

Shaftsbury, s  
 Pool, *m* and *tu*  
 Wareham, s  
 Corf-Castle, *tu*

Frampton, *th*  
 Wimbourn, *f*  
 Sherbourn, *tu* and *f*  
 Sturminster *th*

### Durham.

Is a county palatine, and lies very far in the north of the kingdom; the air is very cold, and the ground not so fruitful as in the southern parts; it is 107 miles in circumference, and contains about 610,000 acres; its chief commodities are coal, iron and lead.

### Market towns.

Durham, is the principal,  
 Auckland, *th*  
 Darlington, *m*

Sunderland, s  
 Bernard's castle, *w*

### Essex.

Is a county bounded by the sea, and lies in the eastern part of England; is 146 miles in circumference, and contains 1,240,000 acres; the soil yield plenty of corn, cattle, and wood; at Walden it affords great store of saffron, and the best in the whole world, the Spanish being nothing in comparison to it.

### Market towns.

Colchester is the county town's  
 Harwich, *tu*  
 Malden, s  
 Chelmsford, *f*  
 Barking, *f*  
 Hatfield, s  
 Rufford, *w*  
 Walden, s  
 Epping, *th* and *f*  
 Braintree, *zo*  
 Billerica, *tu*,

Bruntwood, *th*  
 Dunmore, s,  
 Coggleshall, s  
 Graves, *th*  
 Halstead, *f*  
 Horden, s  
 Raleigh, s  
 Manningtree, *tu*  
 Waltham-abbey, *tu*  
 Troxstead, *f*  
 Sudbury, s

### Gloucestershire.

Is a county exceeding fruitful and delightful; and taken altogether one of the pleasantest parts of the kingdom; it contains about 800,000 acres, affords some of the best cheese in the nation, and wool, hardly inferior to Spanish. It also abounds in wool, iron, steel, and salmon; but its chiefest manufacture is the woollen, which is very extraordinary.

More

Gloucester is the county-town,

Cirencester, *m* and *f*  
Tewksbury, *f*  
Sodbury, *tb*  
Painswick, *tu*  
Stow, *tb*  
Tetbury, *w*  
Wickmore, *m*  
Thornbury, *s*  
Winchcomb, *s*  
Wotton, *f*

Or the county of Southampton, borders upon the channel being a pleasant, healthful, and fruitful county about 140 miles in circumference, and contains about 1,312,500 acres: it affords a vast quantity of corn, grass, sheep, and wood and particularly famous for hogs and honey, both of which, are most excellent in their kind.

Southampton, the county-  
town, tu and s

Andover, s  
Lymington, s  
Alton, s  
Basingstoke, w  
Kingsclear tu

Winchester, w and s  
Portsmouth, 1b and s  
Ringwood, w  
Odiham, s  
Rumsey, s  
Alceston, 1b

To this county belongs the isle of Wight, of a very considerable extent; the principal town is Newport.

### Hertfordshire.

Is a very fine inclosed county, the land somewhat stony but yet very fruitful, affording great plenty of corn, and is very remarkable for good malt; it is 130 miles in circuit, contains about 451,023 acres, and hath an excellent air, &c.

**Market towns.**

Hartford is the county-

town, s  
t Alban's, s  
arnet, m  
are, tu  
enhamstead, m  
ichmansworth s  
atfield, tb

Buntingford, *m*  
 Baldock, *tb*  
 Hitchin, *tb*  
 Hodson, *tb*  
 Stevenage, *f*  
 Tring, *f*  
 Watford, *tx*  
 Hamstead, *tb*

*Herefordshire.*

Is an inland county, of a good soil, and healthful air, 100 miles in circuit, and contains about 660,000 acres; it affords plenty of wool, wheat, salmon, and cyder, which are generally esteemed the best in the kingdom.

*Market towns*

|                                      |                   |                    |
|--------------------------------------|-------------------|--------------------|
| Hereford is the capital <i>w f s</i> | Weobly, <i>tb</i> | Pemb, <i>tu</i>    |
| Leominster, <i>f</i>                 | Kyneton, <i>w</i> | Lenbury, <i>tu</i> |
|                                      | Ross, <i>tb</i>   | Bromyard, <i>m</i> |

*Huntingdon.*

Is a small inland county, of about 67 miles in circuit, and contains about 240,000 acres; it is an open county, but generally very fertile and delightful, abounding in corn and cattle, which are its chiefest commodities.

*Market towns.*

|                                |                     |
|--------------------------------|---------------------|
| Huntingdon the chief, <i>s</i> | St Neots, <i>tb</i> |
| St Ives, <i>m</i>              | Ramsay, <i>w</i>    |
| Kimbolten, <i>f</i>            | Yexley, <i>tu</i>   |

*Kent.*

Is a sea county, on the east part of the channel: it is 160 miles in circumference, and contains about 1,248,000 acres being distinguished into three parts, viz. the marshy as Romney march, &c. the Downs, and the middle, or woody part. It affords great plenty of corn, good pasture, and the best cherries and pippins in the kingdom.

*Market towns.*

|                                                                      |                             |                     |
|----------------------------------------------------------------------|-----------------------------|---------------------|
| Canterbury (famous for its cathedral) is the capital, <i>w and f</i> | Hithe, <i>s</i>             | Lidd, <i>tb</i>     |
| Rochester, <i>f</i>                                                  | Bromley, <i>tb</i>          | Sevenoak <i>s</i>   |
| Maidstone, <i>tb</i>                                                 | Cranebrook, <i>f</i>        | Tenderden, <i>f</i> |
| Dover, <i>w and s</i>                                                | Cray, <i>w</i>              | Malling, <i>s</i>   |
| Sandwich, <i>w and s</i>                                             | Dartford, <i>s</i>          | Milton, <i>s</i>    |
| Romney, <i>tb</i>                                                    | Eltham, <i>m</i>            | Tunbridge           |
| Smarden, <i>f</i>                                                    | Feversham, <i>w &amp; s</i> | Westram, <i>w</i>   |
|                                                                      | Folkstone, <i>tb</i>        | Woolwich, <i>f</i>  |
|                                                                      | Gravesend, <i>w &amp; s</i> | Wrotham, <i>tu</i>  |
|                                                                      | Lenham, <i>tu</i>           | Wye, <i>tb</i>      |

*Sussex.*

Is a maritime county, lying upon the channel between Kent and Hampshire, containing 1,140,000 acres and is 158 miles in circumference. The county is both fertile and healthful, and



and is exceedingly pleasant; the south downs being the most delectable or delightful part of the whole kingdom; and, as I know them, I alledge them to have the most beautiful variety and the pleasantest prospect that can be in the whole culture of nature; the soil being exceeding rich, occasioned by the numerous flocks of sheep kept there; and therefore produce wonderful crops of corn of all sorts; it also hath the finest woods and rivers, and affords the best game for hunting, fishing, and fowling.

*Market towns.*

|                                   |                          |
|-----------------------------------|--------------------------|
| Chichester is the chief, <i>w</i> | Midhurst, <i>th</i>      |
| and <i>s</i> .                    | Stenning, <i>w</i>       |
| East Grinstead, <i>th</i>         | Petworth, <i>w</i>       |
| Hastings, <i>w</i> and <i>s</i>   | Battle, <i>th, s</i>     |
| Rye, <i>w</i> and <i>s</i>        | Hailsham, <i>s</i>       |
| Arundel, <i>w</i> and <i>s</i>    | Brightelmston, <i>th</i> |
| Horsham, <i>s</i>                 | Cuckfield, <i>f</i>      |

*Lancashire.*

Is a sea coast county, bounded on the east by the Irish sea; it is 170 miles in circuit, and contains 1,150,000 acres: the air is very wholesome, and the people generally live to a great age; the soil is very good, and yields corn of all sorts, particularly oats, which are looked upon as the best in the kingdom: it affords plenty of pit coal, and great quantities of excellent fish of all sorts.

*Market towns.*

|                                  |                      |                       |
|----------------------------------|----------------------|-----------------------|
| Lancaster is the                 | Ulverston, <i>th</i> | Rochdale, <i>tu</i>   |
| county-town, <i>s</i>            | Bolton, <i>m</i>     | Howstead, <i>m</i>    |
| Clithero, <i>s</i>               | Blackbourn, <i>m</i> | Hostington,           |
| Liverpool, <i>s</i>              | Cartmel, <i>m</i>    | Garistrong, <i>th</i> |
| Preston, <i>w f</i> and <i>s</i> | Coln, <i>w</i>       | Kirkham, <i>tu</i>    |
| Wigan, <i>m</i> and <i>s</i>     | Bury, <i>th</i>      | Hornbury, <i>w</i>    |
| Manchester, <i>s</i>             | Charaley, <i>tu</i>  | Ormskirk <i>tu</i>    |
| Warrington, <i>w</i>             | Dalton, <i>s</i>     | Prescot, <i>tu</i>    |

*Leicestershire.*

It is a fine pleasant inland county, 96 miles in circuit, contains about 560,000 acres, abounds in corn and good pasture and is very remarkable for beans and peas for horses, which thrive there the best of any county in England; it is also eminent for large sheep which produce abundance of wool and the longest in the kingdom.

*Market towns.*

Leicester is the county-town,

*m and s*Ashby-de-la-Zouch, *s*Botsworth, *w*Harborough, *tu*Hallaton, *tb*Hinkley, *m*Lutterworth, *tb*Loughborough, *tb*Melton, *tu*Mountsorrel, *m*Waltham, *w and tb**Lincolnshire.*

Is a maritime county, part bordering on the German sea, and contains about 1,740,000 acres, being 180 miles in circuit; the western parts are good and fruitful, having plenty of grass, and breed the largest oxen in the kingdom, but the eastern parts are marshy, though well stored with wild fowl.

*Market towns.*Lincoln is the capital, *f*Boston, *w and s*Gantham, *s*Stamford, *m and f*Grimsby, *w*Gainsborough, *tu*Bollingbrook, *tu*Spalding, *tu*Stanton, *m*Binbrook, *w*Alford, *tu*Barton, *m*Barton, *m*Kinton, *s*Bourn, *s*Tattershall, *f*Market Rasen, *tu*Wainfleet, *s*Donnington, *s*Fulkingham, *tb*Holbeach, *tb*Horncastle, *s*Louth, *w and*Sleaford, *m*Spilsby, *m**Middlesex.*

Is the metropolis of the kingdom, and an inland county, having the soil fertile by improvement, and the air sweet and wholesome as any in the kingdom; the Thames parts it from the county of Surry, and is on most accounts the finest river in the world.

*Market towns.*

London the metropolis, hath markets for every day in the week,

Westminster, *m, w, and s*Brentford, *tb*Stains, *f*Uxbridge, *tb*Enfield, *s*Edgeworth, *tb**Monmouthshire.*

Lies upon the borders of Wales, was formerly reckoned a part of it, but is now numbered among the English counties; it is accommodated by the famous river Severn, the second in the kingdom and contains 34,020 acres, being 80 miles in circuit. This county is healthful, abounding with corn, cattle, salmon, and trout.

*Mar*

Market towns

|                           |              |               |
|---------------------------|--------------|---------------|
| Monmouth, the principal s | Caerleon, tu | Pontipool, f  |
| Abergavenny, tu           | Chepstow, s  | Uske, m and f |
|                           | Newport, s   |               |

Norfolk.

Is a large county, bordering on the northern coast, upon the German sea; it is 180 miles in circuit, and contains 1,148,000 acres. The soil is different; in some places fertile in others sandy, and in others deep and heavy. Its principal commodities are corn, wool, honey, and some saffron; but chiefly stuffs and herrings, the first from *Norwich*, and the latter from *Yarmouth*. Sometimes jet and amber is found on the sea coast.

Market towns.

|                                   |               |                            |
|-----------------------------------|---------------|----------------------------|
| Norwich is the capital, w f and s | Dereham, f    | Caston, tu                 |
| Lynn, tu and s                    | Walsingham, f | Comer, s                   |
| Yarmouth, s                       | Downham, s    | Dis, f                     |
| Thetford, f                       | Walsham, w    | Harleston, w               |
| Ayleborough                       | Wincham, f    | Herling, tu                |
| Alesham, s                        | Ropeham, s    | Holt, s                    |
| Buckingham, s                     | Shashm, f     | Wotton, w                  |
| Burnham, s                        | Falkenham, tb | Worsted, s                 |
|                                   | Foulsham, tb  | Seby, every second Monday. |
|                                   | Hingsham, s   |                            |

Northamptonshire.

Is accounted one of the finest inland counties in the kingdom; is 120 miles in circuit, and contains about 550,000 acres. The air is good, and the soil rich: hath several fine rivers, and abounds in corn, wood, and cattle.

Market towns.

|                                 |               |                   |
|---------------------------------|---------------|-------------------|
| Northampton, the county-town, s | Daventry, w   | Kettering, f      |
| Peterborough, s                 | Oundle, s     | Wellingborough, w |
| Brackley, w                     | Towchester, s | Thrapston, tu     |
|                                 | Rothwell, m   | Cliff, tu         |

Northumberland.

Is a sea county, bordering upon Scotland; in some parts the air is sharp, the soil thin and barren; but towards the sea it is tolerably fruitful. In this county are abundance of lead and coal mines, and from thence come the coals called sea coals. Here are good store of wild fowl and fish, particularly salmon.

*Market towns.*

Newcastle is the chief  
town s  
Berwick, s

Morpeth, w  
Hexham, tu  
Wooller, tu

*Nottinghamshire.*

Is an inland county, in circuit 110 miles, and contains 560 000 acres: the air is good and healthful, the soil but indifferent, (a great part being forest ground), the south part pretty fruitful, the west woody, and yields plenty of pitcoal. The river Trent divides it from Lincolnshire.

*Market towns.*

Nottingham is the county-  
town, w f and s  
Newark, w  
Relford, s  
Mansfield, tb

Southwall, s  
Bingham tb  
Worksop, w  
Tuxford in the clay, m

*Oxfordshire*

Is one of the most pleasant, healthful, and fertile counties in the kingdom: it is watered with delightful rivers; as the Thames, The beautiful Cherrald, &c. but above all, it is famous for having the finest university in the world, consisting of 20 colleges endowed, and five halls not endowed, viz.

*Colleges.**Year founded.**By whom founded.*

- |                      |                                                                |
|----------------------|----------------------------------------------------------------|
| 872 University.      | by the Saxon King Alfred,                                      |
| 1262 Baliol,         | by John Baliol King of Scotland,                               |
| 1274 Merton          | by Walter de Merton, Bishop of Rochester.                      |
| 1216 Exeter          | by Walt. Stapleton, Bishop of Exeter.                          |
| 1325 Oriel,          | by King Edward II:                                             |
| 1340 Queen's         | by Robert Eaglesford, B. D:                                    |
| 1375 New,            | by William of Wickham, Bishop of Winchester.                   |
| 1427 Lincoln.        | by Richard Fleming and Thomas Rotham, Bishops of Lincoln.      |
| 1447 All Souls,      | by Hen. Chicheley, Abp. of Canterbury.                         |
| 1459 Magdalen,       | by William of Wainfleet, Bishop of Winchester.                 |
| 1511 Brazen nose,    | by William Smith, Bishop of Lincoln, and Sir Rich. Sutton Knt. |
| 1516 Corpus Christi, | by Rich. Fox, Bishop of Winchester.                            |
| 1549 Christ Church,  | by King Henry VIII:                                            |
| 1555 Trinity,        | by Sir Thomas Pope.                                            |



- 1557 St John's by Sir Thomas White, Lord Mayor of London.  
 1571 Jesus, by Queen Elizabeth.  
 1609 Wadham, by Nicholas Wadham, Esq.  
 1620 Pembroke, by Thomas Tesdale, Esq. and Richard Whitwich, B. D.  
 1709 Worcester, by Sir Thomas Cook.  
 1740 Hartford, by Dr Newton.

*Halls.*

|             |                |          |           |
|-------------|----------------|----------|-----------|
| St Edmund's | } belonging to | Queen's  | } College |
| St Alban's  |                | Merton   |           |
| St Mary's   |                | Oriel    |           |
| New Inn     |                | New      |           |
| Magdalen    |                | Magdalen |           |

*Market towns in Oxfordshire.*

|                      |                           |                      |
|----------------------|---------------------------|----------------------|
| Oxford the capital.  | Henley, <i>th</i>         | Deddington, <i>f</i> |
| w and s              | Whattlington, <i>s</i>    | Bicester, <i>f</i>   |
| Woodstock, <i>tu</i> | Whitney, <i>t</i>         | Brampton, <i>w</i>   |
| Bambury, <i>tu</i>   | Chipping-Norton, <i>s</i> | Fame, <i>tu</i>      |
| Burford, <i>s</i>    |                           | Charlbury, <i>s</i>  |

*Rutland.*

Is a small inland county, 40 miles in circumference, containing about 100,000 acres; affords plenty of corn and cattle; and is remarkable for the redness of the wool which the sheep of that country produce, occasioned by the colour of the soil.

*Market towns.*

Oakhampton, *s* | Uppingham, *w*

*Shropshire.*

Is a plentiful inland county, the air good, and so is the soil: it is in circuit 135 miles, containing about 890,000 acres, and affords plenty of corn, wood, and pit coal, being accommodated by the river Severn.

*Market towns.*

|                                       |                       |                           |
|---------------------------------------|-----------------------|---------------------------|
| Shrewsbury, the county-town, <i>w</i> | Wenlock, <i>m</i>     | Churchstretton, <i>tu</i> |
| <i>th</i> and <i>s</i>                | Elismere, <i>tu</i>   | Oswestry, <i>m</i>        |
| Bishop's castle, <i>f</i>             | Whitechurch, <i>f</i> | Bridgenorth, <i>s</i>     |
| Ludlow, <i>m</i>                      | Drayton, <i>w</i>     | Newport, <i>s</i>         |
|                                       | Wem, <i>th</i>        | Shipton, <i>tu</i>        |

*Somersetshire.*

Is a large plentiful sea-county in the west of England, in circum-

circumference 204 miles, containing about 907,500 acres; it affords great plenty of excellent corn, and good pasture, which feeds abundance of fine cattle; and also yields plenty of lead, copper, crystal stones, and wood for dyers; its chief manufactures are cloth and serges.

*Market towns.*

|                                               |                            |                        |
|-----------------------------------------------|----------------------------|------------------------|
| Bristol is the capital, <i>w</i> and <i>s</i> | Southpetheriton, <i>tb</i> | Canesham, <i>tb</i>    |
| Bath, <i>w</i> and <i>s</i>                   | Axbridge, <i>tb</i>        | Crookhorn, <i>s</i>    |
| Wells, <i>w</i> and <i>s</i>                  | Sheptonmallet, <i>f</i>    | Dulverton, <i>s</i>    |
| Bridgewater, <i>tb</i>                        | Somerton, <i>m</i>         | Glastenbury, <i>tu</i> |
| Ilchester, <i>w</i>                           | Wellington, <i>tu</i>      | Chard, <i>m</i>        |
| Taunton, <i>w</i> and <i>s</i>                | Burton, <i>s</i>           | Longport, <i>f</i>     |
| Wincanton, <i>w</i>                           | Ilminster, <i>s</i>        | Pontford, <i>tu</i>    |
| Watchet, <i>s</i>                             | Dunster, <i>s</i>          | Wilton, <i>tu</i>      |
|                                               | Wivelscomb, <i>tu</i>      |                        |

*Staffordshire.*

Is an inland county, containing about 810,000 acres, and is 141 miles in circuit; the air is sharp, but very healthful; the soil different: Northward it is hilly and barren; but southward it is fruitful and pleasant, and affords plenty of corn, grass, iron, and pit coal; the middle part is level, but something woody: This county also affords good stone, marble, alabaster, and limestone.

*Market towns.*

|                                       |                      |                         |
|---------------------------------------|----------------------|-------------------------|
| Stafford is the county-town, <i>s</i> | Utoxeter, <i>s</i>   | Betley, <i>tu</i>       |
| Litchfield, <i>tu</i> and <i>f</i>    | Eccleshall, <i>s</i> | Locke, <i>w</i>         |
| Newcastle, <i>m</i>                   | Ridgley, <i>tu</i>   | Tudbury, <i>tu</i>      |
| Burton, <i>tb</i>                     | Bromley, <i>tu</i>   | Stow, <i>tu</i>         |
| Penkridge, <i>tu</i>                  | Breewood, <i>tu</i>  | Wolverhampton, <i>w</i> |
|                                       | Walshall, <i>tu</i>  |                         |

*Suffolk.*

Is a sea county, 140 miles in compass, and contains 995,000 acres; the soil different; the best part about St Edmundsbury: it affords abundance of cattle, and butter of the best, but cheese the worst in England.

*Market towns.*

|                                                          |                       |                       |
|----------------------------------------------------------|-----------------------|-----------------------|
| Ipswich is the principal, <i>w</i> <i>f</i> and <i>s</i> | Needham, <i>w</i>     | Lavenham, <i>tu</i>   |
| Dunwich, <i>s</i>                                        | Stowmarket, <i>tb</i> | Mildenhall, <i>f</i>  |
| Orford, <i>m</i>                                         | Newmarket, <i>tb</i>  | Biddeston, <i>w</i>   |
| Aldbrough, <i>s</i>                                      | Beccles, <i>s</i>     | Clare, <i>f</i>       |
| Sudbury, <i>s</i>                                        | Bury, <i>w</i>        | Bungay, <i>tb</i>     |
|                                                          | Hadley, <i>m</i>      | Holsworthy, <i>tb</i> |

|               |                |                |
|---------------|----------------|----------------|
| Eye, s        | Framlington, s | Mendlesham, tu |
| Deddingham, f | Leostaff, w    | Woodbridge, s  |
| Ixworth, f    | Neyland, f     |                |

*Surry.*

Is an inland county, parted by the river Thames from Middlesex; it contains about 592,000 acres, and is in compass 112 miles: The county is plentiful, and the air healthful: it is famous for hunting and horse-racing; the principal goods are hats made in Southwark for exportation.

*Market towns.*

|                 |              |             |
|-----------------|--------------|-------------|
| Guilford is the | Southwark, w | Kingston, s |
| county-town s   | and s        | Croydon, s  |
| Rygate, tu      | Darking, tb  | Farnham, tb |

*Warwickshire.*

Is a pleasant, healthful, and plentiful county, 155 miles in compass, and contains about 670,000 acres: The soil, for the most part is good and fertile; on the north a little woody: This county is remarkable for excellent cheese, going by its name.

*Market towns.*

|                |                |                    |
|----------------|----------------|--------------------|
| Warwick is the | Alcester, tu   | Nuneaton, s        |
| county-town s  | Birmingham, tb | Rugely, s          |
| Coventry, f    | Coleshill, w   | Southam, m         |
| Straford, tb   | Henley, m      | Suttoncolefield, m |
| Atherstone, tu | Kyneton tu     |                    |

*Westmoreland.*

Is a county in the north-west of England: It is 120 miles in circuit, containing about 510,000 acres: This county abounds in hills and marches; and is not very plentiful but in some of the vallies and intervals, and towards the south.

*Market towns.*

|                |               |               |
|----------------|---------------|---------------|
| Appleby is the | Longsdale, tb | Kirbysteven f |
| county-town, f | Burton, tu    | Orton, w      |
| Kendal, s      | Ambleside, w  | Brough, w     |

*Wiltshire.*

Is a fine island county, 140 miles in compass, and contains about 876,000 acres: In the middle lies Salisbury-plain, very remarkable for its large extent, and for feeding large numbers of sheep: and therefore wool is the principal commodity.

*Market*

*Market towns.*

|                       |                          |                      |
|-----------------------|--------------------------|----------------------|
| Salisbury is the cap. | Lanington, <i>w</i>      | Canley, <i>tu</i>    |
| <i>w and s</i>        | Wotton-basset, <i>tb</i> | Warminster, <i>f</i> |
| Hindon, <i>tb</i>     | Cricklade, <i>s</i>      | Bradford, <i>m</i>   |
| Chippingham, <i>s</i> | Devizes, <i>tb</i>       | Amsbury, <i>f</i>    |
| Wilton, <i>w</i>      | Dourton, <i>f</i>        | Anburn, <i>tb</i>    |
| Marlborough, <i>s</i> | Westbury, <i>f</i>       | Swindon, <i>m</i>    |
| Malmsbury, <i>s</i>   | Highworth, <i>w</i>      | Trowbridge, <i>f</i> |

*Worcestershire.*

Is a plentiful inland county, 130 miles in circuit, and contains 543,000 acres; the soil is for the most part good and fertile, affords corn in great plenty, and is very numerous in cattle: it yields plenty of fish and fruit. The vale of Evesham is justly esteemed one of the most fertile spots in the kingdom.

*Market towns.*

|                       |                          |                     |
|-----------------------|--------------------------|---------------------|
| Worcester is the cap. | Droitwich, <i>s</i>      | Pershore, <i>tu</i> |
| <i>w f &amp; s</i>    | Stourbridge, <i>s tb</i> | Tidbury, <i>tu</i>  |
| Evesham, <i>m</i>     | Kidderminster,           | Upton, <i>tb</i>    |
| Bewdley, <i>s</i>     | Bromsgrove, <i>tu</i>    | Shipton, <i>f</i>   |

*Yorkshire.*

Is a maritime county, and much the largest in all England: and is divided into three parts, called Ridings, viz. North, East, and West: 'Tis in general a plentiful county, abounding in corn, cattle, fish, and fowl, and famous for breeding saddle horses. It is 320 miles in circumference and contains 3,770,000 acres, it sends great quantities of woollen cloth to London, and elsewhere, being its chiefest manufacture.

*Market towns.*

York is the capital; market days Thursday and Saturday; with 36 other market towns, too numerous here to particularize.

*The PRINCIPALITY of WALES.*

WALES was originally independent on England, but in the reign of King Henry the VII, it was incorporated with it. This country is very mountaneous, and barren, except in the vallies and intervals, where it yields plenty of grass and corn. The situation is westward, bordering on the Irish sea: the air bleak and sharp, but wholesome; the cattle are numerous, but very small: and on the hills there are goats.



in abundance. This country is divided into north and South viz.

**NORTH WALES,**

Contains Anglesea, Carnarvonshire, Denbighshire, Flintshire, Merionethshire, Montgomeryshire.

**Anglesea.**

Is an island in the north-west part of the country, about 80 miles in compass, and contains about 200,000 acres. It affords plenty of corn, cattle, fish, fowl, and mill-stones, (for grinding of corn) in abundance. It has but two market towns, viz. Beaumaris and Newborough, Wednesday is the market-day of the first, and Tuesday of the latter.

**Carnarvonshire.**

Is a sea coast county, 110 miles in compass, containing about 340,000 acres. It hath plenty of corn, cattle, fish, and wood: the air is healthful, and the soil good, especially the western part, which produces abundance of excellent barley.

**Market towns.**

Carnarvon is the chief, s

Bangor, w

Krobich, w

Polbel, w

Aberconway, f

Newin, s

**Denbighshire.**

Is 116 miles in circuit, and contains about 410,000 acres. The middle of this county hath plenty of rye, coals, and sheep; it hath also some small lead mines; but the chief part of it is a valley called Diffryn Chuid, exceeding pleasant and fertile, adorned with several gentlemen's seats, and those of good estates. Denbigh is the county town, and the market-day on Wednesday. Wrexham is another of its principal market towns, a pretty town, and famous for its market, neat church, and lofty steeple.

**Flintshire.**

Contains about 160,000 acres, and is in circuit 82 miles. It hath but three towns, viz. Flint, St Asaph, and Gairns: the first so small, that it hath no market. It is an hilly country, but the vales are very fertile, and the inhabitants commonly live to an advanced age. Its commodities are small cattle, butter, cheese, pit-coal, lead, and mill-stones. In this

county

county is St Winifred's well, so famous for curing aches, lameness, and, as some say, for propagation.

*Merionethshire.*

Is 80 miles in circuit, and contains about 500,000 acres. The county in general is mountainous, but yet not without plenty of small cattle, and other necessities for the inhabitants. The principal manufacture is cotton work. The principal town is Harlech, which hath a pretty good market on Saturday.

*Montgomeryshire.*

Is 94 miles in circuit, and contains 524,000 acres. 'Tis fruitful, though mountainous, and hath six small market towns, but no manufactures worth notice;

**SOUTH WALES,**

Contains Brecknockshire, Cardiganshire, Carmarthenshire Glamorganshire, Pembrokeshire, and Radnorshire.

*Brecknockshire.*

Is 106 miles in circuit, and contains about 620,000 acres, divided into hills and vallies; the first but barren, but the latter very plentiful, wholesome, and pleasant Brecknock is the chief town, and hath two markets in a week, viz. Wednesdays and Saturdays. The commodities are cattle, fish, and some small quantity of otters fur.

*Cardiganshire.*

Is 94 miles in compass, and contains about 520,000 acres. It is situated on the banks of the Irish sea, and hath plenty of corn, cattle, fish, fowl, &c. Of late years it is become remarkable for its silver, copper, and lead mines.

*Carmarthenshire.*

It is one the most plentiful counties in all Wales, the air good, and the soil fertile. It affords plenty of corn, cattle, salmon, wood, pit-coal, and the best lead. It is 120 miles in compass, containing about 700,000 acres

*Glamorganshire.*

Is a very fine plentiful county; in the south part it is so fruitful, that it is called the garden of Wales. It is 112 miles in circuit, and contains about 540,000 acres. Cardiff is the county town, which keeps two market days weekly, viz. Wednesday and Saturday.

*Pembro*

*Pembrokeshire.*

Is a very pleasant and plentiful county, for the most part surrounded by the sea. It is 93 miles in compass, and contains about 520,000 acres. This county is famous for a harbour, called Milford Haven, which is justly esteemed to be in many respects one of the best in the world. Pembroke is the principal town, whose market is kept on Saturday.

*Radnorshire.*

Is one of the most barren and unfruitful counties in all Wales. It is in circuit 90 miles, and contains about 310,000 acres. The assizes are usually kept at Prestain, but Radnor is the shire town, and hath a tolerable market upon Saturday. and Prestain hath another on Wednesday.

**SCOTLAND,**

IS situated on the north of England; the capital is called Edinburgh; it is divided into the following shires or counties

*South of the Firth of Forth.*

Galloway,  
Nithsdale,  
Annandale,  
Eskdale with Unsdale,  
Lindsdale,  
Tiviotdale,  
The Mers,  
Lawderdale,  
Tweeddale,  
Clydesdale,  
Keyle,  
Carrick,  
Lothian,  
Stirling,  
Renfrew,  
Cunningham,  
Isles of Bute and Arran,  
Peninsula of Cantyre,

*Chief Towns.*

Kirkcudbright.  
Dumfries.  
Annan.  
Hermitage.  
Jedburgh.  
Dunse.  
Lawder.  
Peebles.  
Glasgow.  
Ayr.  
Biggar.  
Edinburgh.  
Stirling.  
Renfrew.  
Irwin.  
Rothsay.  
Kilkerran.

*North of the Firth of Forth.*

Fife,  
Monteith,  
Lennox,  
Argyle,

*Chief Towns.*

St Andrews.  
Dumblane.  
Dumbarton.  
Inverary.

Perth,  
 Strathern,  
 Bradalbane,  
 Lorn,  
 Mearns,  
 Angus,  
 Gowry,  
 Athol,  
 Marr,  
 Badenoch,  
 Lochabar,  
 Buchan,  
 Bamff,  
 Murray,  
 Ross,  
 Sutherland,  
 Strathnaven,  
 Caithness,

Perth.  
 Abernethy.  
 Dunstaff age,  
 Bervey.  
 Dundee.  
 Blair.  
 Aberdeen.  
 Ruthven.  
 Innerlochy.  
 Peterhead.  
 Bamff.  
 Elgin.  
 Tain.  
 Dornoch.  
 Stratheny.  
 Wick.

To these may be added the Hebrides or Western Isles, said to be above 300 in number, the most considerable of which are Arran, Sky, and Mull; and the Isles of Orkney and Shetland, to the northward of each of which, there are many in number.

### IRELAND.

IS a large island to the west of England and Scotland, the Chief city of which is Dublin; it is divided into four provinces, which are again subdivided into the following counties.

#### *County of Munster.*

Tipperary,  
 Waterford,  
 Clare,  
 Limerick,  
 Cork,  
 Kerry,

#### *Chief towns.*

Clonmel.  
 Waterford.  
 Clare.  
 Limerick.  
 Cork.  
 Dingle.

#### *County of Leinster.*

Lowth,  
 Dublin,  
 Wicklow,  
 Waterford,  
 Longford,  
 Meath,  
 King's County,

Drogheda.  
 Dublin.  
 Wicklow.  
 Waterford.  
 Longford.  
 Mullingar.  
 Phillipstown.



Queen's County,  
Kilkenny,  
Kildare,  
Caterlough,  
*County of Ulster.*

Maryborough.  
Kilkenny.  
Kildare.  
Carlow.

Down,  
Armagh,  
Monaghan.  
Caven,  
Antrim,  
Londonderry,  
Tyrone,  
Fermanagh,  
Donegal,

Down,  
Armagh.  
Monaghan.  
Caven.  
Carrickfergus.  
Londonderry.  
Dungannon.  
Inniskilling.  
Donnegal.

*County of Conaught.*

Leitrim,  
Roscommon,  
Galway,  
—Mayo.  
Sligo,

Leitrim.  
Athlone.  
Galway.  
Mayo.  
Sligo

In St George's channel, almost equally distant from England, Scotland and Ireland; is situated the Isle of Man, the royalty of which under the Kings of Great Britain, was formerly held by the Stanleys, Earls of Derby : the male issue of that family being extinct, it was enjoyed by the Duke of Athol, descended from the Derby family by a female branch, till the Session of Parliament 1765, when it was annexed to the Crown.

The Br tannic isles above described, are separated from France, on the south by the English channel; and from the Netherlands, Germany, Denmark, and Norway, by the German ocean on the east; the northern and western sides being washed by the ocean so called.

The Netherlands, have Germany on the east and north, the German ocean to the west, and France on the south; they consist of seventeen provinces; of which seven compose a Republic, called the United Provinces; and the remaining ten are subject to the house of Austria.

The seven United Provinces are inhabited by the Dutch; and are commonly called Holland, after the name of the most considerable of them: The names of the provinces and their capitals follow.

*Provinces.*

Holland,  
Zeeland,  
Utrecht,  
Guelderland,  
Over Issel,  
Friesland,  
Groningen

*Chief towns.*

Amsterdam.  
Middleburgh.  
Utrecht.  
Zutphen.  
Deventer.  
Lewarden.  
Groningen.

The ten provinces are now commonly called the Austrian Netherlands, or Flanders, from the name of one of them. The names of their provinces and their capitals follow.

*Provinces.*

Guelderland,  
Brabant,  
Luxemburgh,  
Limburgh,  
Flanders,  
Artois,  
Hainault,  
Namur,  
The Marquisate of the Emp.  
Malines,

*Chief towns.*

Guelders.  
Brussels.  
Luxemburgh.  
Limburgh.  
Bruges.  
Arras.  
Mons.  
Namur.  
Antwerp.  
Malines.

The empire of Germany, has on the east side Prussia, Poland, and Hungary: the Baltic sea, Denmark, and the German Ocean on the north; the Netherlands, and part of France on the west; and the Alps which separate it from Italy on the south.

This country is a large Republic, whose chief officer is called the Emperor; he is elected by nine of the most considerable princes, thence called Electors. Their names and principal cities follow.

*The Electors.*

Archbishop of Mentz,  
Archbishop of Treves,  
Archbishop of Cologne,  
Queen of Bohemia.  
King of Prussia, as Marquis of  
Brandenburgh,  
King of Poland, as Duke of  
Saxony,  
King of G. Britain, as duke of  
Brunswick Lunenburg,  
Duke of Bavaria,  
Count Palatine of the Rhine,

*Chief Towns.*

Mentz.  
Treves.  
Cologne,  
Prague.  
Berlin.  
Dresden.  
Hanover.  
Munich.  
Manheim.

There

There are great numbers of other dominions in Germany but for brevity's sake we shall mention only the following, with their capitals, viz.

|                                    |             |
|------------------------------------|-------------|
| The Arch Duchy of Austria,         | Vienna.     |
| The Landgraviate of Hesse Cassel,  | Cassel.     |
| The Duchy of Wintemburgh,          | Stutgard.   |
| Alsace, now subject to the French, | Strasburgh. |

There are also in Germany several free cities, which are so many small Commonwealths, under the protection of the Germanic body, such as Ratisbon, Frankfort, Hamburgh, &c. Among the Alps are other small Commonwealths, commonly known by the name of the Swiss Cantons, the principal of which Zurich, Bern, Basil and Eriburgh; with these are confederated the Republic of Geneva, and the leagues of the Grisons: all situate among those mountains.

The kingdom of Hungary hath Poland on the north, Germany on the west, and on the other sides the Turkish empire; the chief city is called Buda: other considerable cities are Presburgh, Raab, Zygeth, Canisia, Alba Regalis, Gran, Szigoniam, Pest Temeswaer, &c. all famous in history, on account of the contests between the Christians and Turks, for the sovereignty of this kingdom.

It is at present under the dominion of Maria Theresa, daughter of the late emperor Charles the Sixth, who is queen of Hungary and Bohemia, Archduchess of Austria, &c. and is married to Francis, Emperor of Germany, great Duke of Tuscany, &c.

Poland is a large elective kingdom, bounded on the east by Crim Tartary and Muscovy, on the north by part of Muscovy and the Baltic sea; on the west by Germany, and on the South by Hungary and part of Turkey; the capital city is called Warsaw.

Denmark and Norway, two kingdoms under the same sovereign, are bounded on the north and west by the ocean; on the south part of Germany and the Baltic sea, and on the east by Sweden; the capital of Denmark is called Copenhagen, and that of Norway, Bergen.

Sweden has Denmark on the west, the Baltic sea on the south, Muscovy on the east, and the ocean on the north, the chief city is called Stockholm,

Muscovy, or Russia, hath part of Sweden and the Baltic sea on the west, Poland and Crim Tartary on the South; Great Tartary in Asia on the east, and the ocean on the north; the ancient capital is called Muscov; but the residence

of the count is now generally at Petersburg, on the Baltic sea. This empire is very extensive, being near as big as all the rest of Europe.

### ASIA,

IS separated from Europe toward the north-west by the boundaries above described, toward the south-west by the eastern part of the Mediterranean sea; and by the Isthmus of Suez and the Red sea, which divide it from Africa; it is bounded on the South by the Indian ocean, on the east by the Pacific, and on the north by the Northern or Frozen ocean; its dimensions may be conceived from what follows: Holy Cape on the northern ocean, in lat. 72 deg. 32 min. N. long. 179; 45 E bears from the eastern point of Java, one of the Indian isles, in lat. 8 deg. 30 min. S. long. 115.55 E. N. 28 45 E. distance 5540 miles. And Cape Ava, in the island of Japan, in the Pacific ocean; lat 34 55 N. long. 141 00 E. bears from Smyrna in the Archipelago, lat. 31 28 N. long. 27 25 E. S. 87 48 E. distance 5550 miles.

It seems most regular to divide this large country according to its present possessors, the Grand Seignior or Emperor of the Turks, the Sophy or king of Persia, the great Mogul, and the other potentates of India, the Emperor of China and the Potentates of Tartary.

The Turks possessions in Asia are Anatolia, Syria, Arabia, Armenia or Turcomania; Georgia, and Mesopotamia or Diarbeck; of which in their order.

Anatolia, formerly called Asia minor, is compassed on the north, west, and south sides by the Euxine, the Marmariath, the Archipelago, and the Mediterranean seas; it is separated from Syria on the Southeast by the mountains called Taurus, and from Turcomania on the east by the river Euphrates.

Its present subdivisions are said to be four, Anatolia Proper, on the north east, having a capital city, Bursa; Amasia, on the south-west, its capital of the same name; Caramenia, on the south-west, its capital Gogni; and Aladuli on the south-east, its capital Maraz.

Syria called by the Turks Suristan, is generally subdivided, into Syria Proper Phœnicia, and Palestine, or Judea; whose chief cities are Aleppo, Damascus, and Jerusalem.

Arabia (a country which preserves its ancient name, as do the inhabitants their roaming disposition) is bounded on the west by the Red sea and Isthmus of Suez; on the north by Palestine, Syria, and Diarbeck; on the east by the Persian gulph



gulph, and on the south-east by the Arabian sea, a part of the Indian ocean.

It is divided into three parts, called the Desert, the Stony, and the Happy; the two first lie to the northward, the other to the south.

There are very few towns in the desert or stony parts of this country, the Arabs living in tents, and removing with their families from place to place, as convenience suggests. But in Arabia the Happy (one of the finest countries in the world) there are several of note, such as Medina, where the sepulchre of Mahomet, the founder of the Turkish religion is; Mecca his birth-place, to which every Turk or Mussulman is obliged by that religion, to come in pilgrimage once in his life-time, or to send another in his stead; Aden, a place of traffic: Sana, Mocha, Soar and others.

Armenia or Turcomania is bounded on the west by Anatolia; on the south by Diarbeck, on the east and north by Georgia and the Euxine sea; its principal cities are Arzerum, Chas, and Van.

Georgia formerly called Iberia, including Mingrelia and Gurgestan, is bounded on the north by part of Muscovy, on the west by the Euxine sea, on the south by Turcomania, and part of Persia, and on the east by part of Persia: the cities of greatest note are Fasso and Tiflis.

Mesopotamia or Diarbeck. is bounded on the north by Turcomania, on the west by Syria, on the south by Arabia the Desert, and on the east by Persia; its principal cities are Diarbekir, Mosul, and Bagdat.

Besides these large possessions on the continent of Asia, the Turks hold several islands in the Archipelago; with Rhodes and Cyprus in the Mediterranean sea, the last of which is very considerable.

The next division of Asia, proceeding eastwardly, is Persia, which has the Turkish dominions on the west, the Persian Gulph and part of the Indian ocean on the south, the empire of the Great Mogul on the east, and on the north part of Tartary, the Caspian sea, and part of the Muscovian empire.

This is a very large country, but at present torn to pieces by different competitors for the sovereign power; the capital city is Ispahan; the most considerable of the others are Derbent on the Caspian sea, and Gombroon and Bassora on the Persian gulph.

Proceeding still eastward, the next empire is that of the Great Mogul, which has Persia on the west, the two Indian Penin-

Peninsulas and the bay of Bengal on the South, China on the east, and part of Tartary on the north.

This is another large tract, with the inland parts of which the Europeans are not much acquainted.

The principal cities are Agra or Lahro, Delhi, Cabul, and Cuximir, but whether Agra or Lahul is the capital, is difficult to determine, as authors do not agree concerning it; it is agreed however, that the mogul hath a magnificent palace at each of those cities.

The maritime parts of the continent of India is divided by the Bay of Bengal, a branch of the Indian ocean, into two peninsulas, anciently called India within or on this side the Ganges, and India without or beyond the Ganges; besides which two peninsulas, there are several large islands belonging to India, of which in their order.

The peninsula on this side the Ganges, contains several distinct territories or kingdoms, most of which either are or were subject, or at least tributary, to the Mogul; the western side thereof is called the coast of Malabar, the eastern the coast of Coromandel.

The coast of Malabar contains several European settlements; such as Bombay an Island belonging to the English East India Company, and Coa, to the Portuguese: at each of which they have the Sovereignty; and the English trade, at least if they have not fors, at Gazurate, Surat, Calicut, and Cochlin.

The island called Ceiland or Ceylon, by some called Zeloan, is situated a little to the east of Cape Comorin, the most southern point of this peninsula.

The coast of Coromandel, which is washed by the bay of Bengal, tends toward the N. and N.E. from the Cape Comorin, and extends to the mouth of the Ganges: the principal settlements of the English on this coast are, Madras, or Fort St George, and Fort St David, near which the French have a settlement called Pondicherry, which neighbouring settlements were for several years at war with each other, with various success; the natives, headed by their princes, called Nabobs, having taken part therein, some on one side and some on the other.

The peninsula on the other side of the Ganges consists of the large kingdoms of Bengal, having a capital of the same name: Pegu, whose chief cities are Pegu and Arracan; Siam, having a capital of the same name; Malacca, situate to the south, is almost encompassed by the sea; the city so called is situate near the southern extremity; Cochlin China whose  
city

city is named Cambodia, and Tunquin, whose capital is of the same name.

South west of Malacca is the island of Sumatra.

South-east of this lies the island of Java, separated by the straits of Sunda; the western point of which is called Java Head by English mariners, it being often the first land made by them after they have doubled the Cape of Good Hope; the principal cities are Bantam and Batavia, the latter of which belongs to the Dutch East India Company, who are sovereigns (or if not, yet act as such) over the greatest part this large and fruitful island.

Eastward from Malacca and Sumatra is the island Borneo almost round, and near 600 miles in diameter.

The island Celebes is to the east of Borneo, and much less than it. Proceeding eastward are the Molucca or Spice Islands, the Dutch have made themselves masters of these, and thereby ingross the Spice trade to themselves.

The Philippine isles are very numerous, some authors have reckoned 1,000 of them; the most considerable is Luconia, whose capital is Manilla.

To the north and north-west of these is situated the potent empire of China, reckoned to be as large as all Europe; it hath the Pacific ocean on the east and south east; Cochin-China and Tonquin on the south-west; the Mogul's empire on the west, on the north-west and north a part of Tartary.

There are a great number of cities in this empire, of which Pekin, situated in the northern part of the country is the capital; the European trade to this country is chiefly carried on at Canton, a great sea port in one of the southern provinces.

The most extensive Chinese islands are those which compose the empire of Japan; which consists of several large islands, three of which are very considerable, viz. Japan or Nippon, whose capital is Meaco; Tonsu, whose capital is Sanuqui; and Bongo, whose capital bears the same name.

Thus we have taken a cursory survey of all the southern parts of Asia; the northern hath only one general name, viz. Tartary: which hath Persia, India, and China on the south, and the Pacific ocean on the east, the Northern or Frozen ocean on the north, and Muscovy on the west: this tract is subject to divers Potentates, some of which are very little known.

## AFRICA.

IS a large Peninsula, which is joined to the continent of Asia by the Isthmus of Suez, a narrow Desert between the Mediterranean and Red seas; its magnitude may be conceived by knowing that the Cape of Good Hope in lat. 34 deg. 15 min. S. lon. 20. deg. 7 min. E. bears from Ceuta in lat. 35 deg. 45 min. N. long 4 deg. 42 min. W. S. 18 deg 15 min. E. distance 4440 miles, and that Cape Guardafuy, in lat. 11 deg. 48 min. N. long 50 deg. 25 min. E. bears from Cape Sierra Leone, in lat. 8 deg. 30 min. N. long. 12 deg. 7 min. W. N. 87 deg. 00 E. distance 3700 miles.

Very little of the inland parts of this continent are known to the Europeans; so that only the sea coasts will be mentioned here, beginning at the Isthmus of Suez, and coasting first the Mediterranean sea.

Egypt is under the dominion of the Turks, its present capital is called Cairo; the piratical states of Tripoles, Tunis, and Algiers, have capitals of the same name, and the capital of the empire of Morocco is the city of Fez.

Along the coasts of the Atlantic ocean, there are no extensive dominions, the inhabitants being mostly subject to petty princes of their own, who being almost continually at war with one another, sell their prisoners for slaves; the European nations have been induced for the protection of their trade therein, and other commodities, to erect several small forts in different places, to enumerate which would be tedious: The Madeiras, the Canaries, and the Cape de Verd islands, are the most considerable on this coast; the only one possessed by the English is a very small one, called St Helena, frequented by the East-India ships.

At the southern extremity of the continent is situated the Cape of Good Hope, where the Dutch East-India company have built a tolerable town for the convenience of their shipping: from thence again, along the eastern coast, both on the ocean and in the Red sea, very little that is remarkable offers itself.

At some distance, however, from that part of this coast which is washed by the ocean, is situated one of the largest islands in the world, called Madagascar, which has been at different times the asylum of the European pirates.

## AMERICA.

BY some called the New World, because discovered about 300 years ago, being before that time unknown to the inhabitants



tants of Europe, Asia, and Africa, is divided into two remarkable divisions, called North and South America; which are joined by the Isthmus of Darien or Panama.

The sea coast of North America, and part of the inland countries, formerly belonged to Britain, but is now under the dominion of the American States: Charlestown in S. Carolina, lat. 33. 22. N. long. 76. 50. W. bearing from Cape Can- so, in Nova Scotia, lat 45. 10. N. 49. 50. W. S. 52. miles to a degree, makes 1345 English miles: which, making allowance for the winding of the coast, may be very well considered to be really more than 1500 English miles,) The country with their chief towns follows.

New England.

New York,

Pennsylvania.

New Jersey, East,

New Jersey, West,

Maryland,

Virginia,

North Carolina,

South Carolina,

Georgia

Chief Towns.

Boston.

New York,

Philadelphia.

Elizabeth Town.

Elsingburgh.

Baltimore.

James Town.

Epenton

Charlestown.

Savannah.

The British possess Nova Scotia, whose chief town is Halifax; Canada whose capital is Quebec, situate on the great river St. Lawrence; Newfoundland, a large island near the mouth of this river; and Cape Breton, a much smaller, but well fortified island.

The Spaniards possess the sea coast of Florida, the next southern country, the principal settlements therein being St Augustine, the French have some settlements to the west of these along the river Mississippi, which empties itself into the gulph of Mexico, the principal is Fort St Luis, from whence the country is called Louisiana.

More to the south-west is the empire of Mexico and its dependants, having a capital of the same name, subject to the Spaniards: this country extends itself westward to the Pacific ocean, and the Spaniards sends ships yearly from Acapulco, a port therein, across the ocean, to the Philippine isles on the East-Indies.

Northward on the Pacific ocean is New Mexico, and the island of California; but of these we know but little.

The continent of South America consists of the following large districts, viz.

*Names*

| <i>Names.</i>    | <i>Chief Towns.</i> | <i>In whose Possession;</i> |
|------------------|---------------------|-----------------------------|
| Terra Firma,     | Panama,             | Spaniards,                  |
| Golden Castile,  | Carthagena,         | Ditto.                      |
| Guiana,          | Surinam,            | Dutch.                      |
| Peru,            | Lima,               | Spaniards.                  |
| Chili,           | St Jago,            | Ditto.                      |
| Patagonia,       |                     | Natives.                    |
| Terra del Fuego, |                     | Ditto.                      |
| La Plata,        | Buenos Aires,       | Spaniards.                  |
| Brazil,          | St Salvador,        | Portuguese.                 |
| Paraguay,        | Assumption,         | Jesuits.                    |
| Amazonia,        |                     | Natives.                    |

N. B. Terra del Fuego is an island separated from Patagonia, by the streights of Magellan.

The gulph of Mexico, Juchatan, Honduras, and the Caribbean sea, are separated from the Atlantic ocean by a great number of islands, called the Bahama, the greater and lesser Antiles, and Caribbee Islands. The names of the most considerable are as follow, viz.

| <i>Islands.</i>   | <i>Chief Towns.</i> | <i>In whose Possession</i> |
|-------------------|---------------------|----------------------------|
| Cuba,             | Havannah,           | Spaniards.                 |
| Hispaniola, or    |                     | French and                 |
| St Domingo,       | St Domingo,         | Spaniards.                 |
| Jamaica,          | Port Royal,         | English.                   |
| Porto Rico,       | Porto Rico,         | Spaniards.                 |
| Anguilla,         |                     | English.                   |
| Bermuda,          |                     | Ditto.                     |
| St Christopher's, |                     | Ditto.                     |
| Nevis,            |                     | Ditto.                     |
| Antigua,          |                     | Ditto.                     |
| Montserrat,       |                     | Ditto.                     |
| Barbadoes,        | Bridge-town,        | Ditto.                     |
| Guadaloupe,       |                     | French.                    |
| Martinico,        |                     | Ditto.                     |
| St Martin,        |                     | Ditto.                     |
| Santa Cruz,       |                     | Ditto.                     |
| St Lucia,         |                     | English.                   |

The Islands called Bermudas, lying about 500 leagues east of Florids, are subject to the British.

ASTRO.

## ASTRONOMY.

**A**STRONOMY is a science which treats of the motions and distances of the heavenly bodies, and of the appearances thence arising.

There have been a great variety of opinions, among the Philosophers of the preceding ages, concerning the disposition of the great bodies of the universe, or of the position of the bodies which appear in the heavens: But the notions now embraced by the most judicious Astronomers are that the universe is composed of an infinite number of systems of worlds; that in every system there are certain bodies moving in free space, and revolving at different distances around the sun, placed in or near the centre of the system; and that these suns, or other bodies, are the stars which are seen in the heavens.

That system, in which our earth is placed, is by Astronomers called the Solar System; and that opinion, which supposes the Sun to be fixed, in or near the centre, with several bodies revolving round him, at different distances, is confirmed by the observations hitherto made.

This opinion is also called the Copernican System; from Nicholas Copernicus, a Polish philosopher, who about the year 1473, revived this notion from the oblivion it had been buried in for many ages.

The Sun therefore is placed in the midst of an immense space, wherein six opaque sphericall bodies revolve about him as their centre.

Those wandering globes are called planets, which at different periods, perform their revolutions, from west to east in the following order.

I. Mercury is nearest to the Sun of all the planets, and performs his course in about three months, or 87 days, 23 hours.

II. Venus, in about seven months and a half, or 224 days, 17 hours.

III. The Earth, in a year, or 365 days, 6 hours.

IV. Mars, in about two years, or 686 days, 23 hours.

V. Jupiter, in 12 years, or 4231 days, 12 hours.

VI. And lastly, Saturn, whose orbit includes all the rest, spends almost thirty years, that is 10759 days, 8 hours, in one revolution round the Sun. The distance of the planets

Z

from

\* By the orbit of a planet, is commonly understood the track or ring described by its centre round the Sun; but by the plane of the orbit is meant a flat surface, extended every way through the orbit infinitely.

from the sun are nearly in the following proportion, viz. supposing the distance of the earth from the sun to be divided into 1000 equal parts; that of Mercury will be about 387 of those parts; of Venus 724; of Mars 1524; of Jupiter 5201; and that of Saturn 9538.

The orbits of the planets are not all in the same plane, but variously inclined to one another; so that, supposing the orbit of the earth to be the standard, the others will have one half above, and the other half below it; intersecting one another in a line passing through the Sun.

The plane of the earth's orbit is called the *Ecliptic*, and this the Astronomers make the standard, to which the planes of the other orbits are judged to incline.

The right line passing through the Sun, and the common intersection of the plane of the orbit of any planet with the ecliptic, is called the line of the *Nodes* of that planet, and the points themselves, wherein the orbit cuts the *Ecliptic*, are called *Nodes*.

The inclination of the orbits of the planets to the plane of the *Ecliptic* are as follows, viz. the orbit of Mercury makes an angle of 6 deg. 52 min; that of Venus 3 deg. 23 min; of Mars 1 deg. 52 min; of Jupiter 1 deg. 20 min; and of Saturn 2 deg. 20 min. The orbits of the planets are not circles, but *Ellipses* or *ovals*.

What an *Ellipsis* is, may be easily known from the following description; imagine two small pegs fixed upright on a plane, and suppose them tied with the ends of a thread, somewhat longer than their distance from one another; now if a pin be placed in the double of the thread, and turned quite round (always stretching the thread with the same force) the curve described by the motion will be an *Ellipsis*. The two points where the pegs stood, (about which the thread was turned) are called the *Foci*, or *Foci* of that *Ellipsis*; and without changing the length of the thread, we alter the position of the pegs, we shall then have an *Ellipsis* of a different kind from the former; and the nearer the foci are together, the nearer will the curve described be to the circle, until at last the focusses, coincide, and then the pin in the doubling of the thread will describe a perfect circle.

The orbits of all the planets have the sun in none of their foci, and half the distance between the two focusses is called the *excentricity* of the orbits. This *excentricity* is different in the planets, but in most of them it is so small, that in little schemes or instruments, made to represent the planetary orbits, it need not be considered.



If, as before, we suppose the mean distance of the earth from the sun to be divided into 1000 parts; then will the excentricity of Mercury be 81 of those parts: that of Venus 5; and that of the earth 17; that of Mars, 141; that of Jupiter 240; and that of Saturn, 543 of the same parts.

The six planets above mentioned, are called *Primaries*, or primary planets; but, besides these, there are ten other lesser planets, which are called *secondaries*, *Moons*, or *Satellites*. These *Moons* always accompany their respective primaries, and perform their revolutions round them, whilst both together are also carried round the sun.

Of the six primary planets, there are but three as far as observation can assure us, that have these attendants, viz. the Earth, Jupiter and Saturn.

The Earth is attended by the Moon, who performs its revolution in about 29 days and a half, at the distance of about 30 diameters of the earth from it; and once a year is carried round the Sun along with the earth.

Jupiter has four moons, or satellites; the first or innermost performs its revolution in about one day and 18 hours and a half, at the distance of 5 and a half semi-diameters of Jupiter from the centre; the second revolves about Jupiter in 3 days and 13 hours, at the distance of 9 of his semi-diameters; the third in 7 days and 4 hours, at the distance of 14 one third semi-diameters: the fourth and uttermost performs its course in the space of 16 days 18 hours and its distance from Jupiter's centre is 25 one third of his semi-diameters.

Saturn has no less than five satellites: the first or innermost revolves about him in 1 day and 21 hours, at the distance of 4 three eighths diameter of saturn from his centre; the second completes his period in 2 days and 3 fourths, at the distance of 5 diameters and three-fourths; the third, in about 4 days 1 second, at the distance of 8 diameters; the fourth performs his course in about 16 days, at the distance of 18 diameters; the fifth and uttermost takes 79½ days to finish his course, and is 54 diameters of Saturn distant from his centre. The Satellites, as well as the Primaries, perform their revolutions from West to East; the planes of the orbits of the Satellites of the same planet, are inclined to one another, and consequently are inclined to the plane of the orbit of the primary.

Besides these attendants, Saturn is encompassed with a thin ring, that does no where touch his body; the diameter of the ring is to the body of Saturn, as 9 to 4; and the void space be-

tween the ring and the body of Saturn, is equal to the breadth of the ring itself; so that in some situations, the heavens may be seen betwixt the ring and his body.

This surprising phænomenon of Saturn's ring is a modern discovery; neither were the Satellites of Jupiter and Saturn known to the ancients; the Jovial planets were the first discovered by the famous Italian philosopher, Galilæus, by a telescope which he first invented; and the celebrated Cassie, the French king's astronomer was the first that saw the Satellites of Saturn; which by reason of their great distances from the sun, and the smallness of their own bodies, cannot be seen by us but by the help of very good glasses.

The motion of the primary planets round the sun, (as also of the Satellites round their respective primaries) is called their annual motion; because they have one year, or the alterations of the seasons, complete in one of those revolutions. Besides this annual motion, four of the planets, viz. Venus, the Earth, Mars, and Jupiter, revolve about their own axis, from west to east; and this is called their diurnal motion. For by this rotation each point of their surface is carried successively towards or from the sun, who always illuminates the hemisphere which is next to him, the other remaining obscure; and while any place is in the hemisphere illuminated by the sun, it is day; but when it is carried to the obscure hemisphere, it becomes night; and so continues, until, by this rotation, the said place is again enlightened by the sun.

The earth performs its revolution round its axis in 23 hours 56 minutes; Venus in 23 hours; Mars in about 24 hours and 40 minutes; and Jupiter moves round his own axis in 9 hours and 56 minutes.

The sun is also found to turn round his axis from west to east in 27 days; and the moon, which is nearest to us of all the planets, revolves about her axis in a month, or in the space of time that she turns round the earth, so that the lunarians have but one day throughout their year.

The planets are all opaque bodies, having no light but what they borrow from the sun; for that side of them which is next towards the sun, has always been observed to be illuminated, in what position soever they be; but the opposite sides which the solar rays do not reach, remain dark and obscure; whence it is evident, that they have no light but what proceeds from the sun: for if they had, all parts of them would be lucid, without any darkness or shadow. The planets are likewise proved to be globular, because, let what

part

part of them soever be turned toward the sun, its boundary, or line separating that part from the opposite, always appears to be circular; which could not happen if they were not globular.

The earth is placed betwixt the orbs of Mars and Venus: and so Mercury, Venus, Mars, Jupiter and Saturn, do all turn round the sun; both which may be proved from observations as follow

1. Whenever Venus is in conjunction with the sun, that is, when she is in the same direction from the earth, or towards the same part of the heavens the sun is in; she either appears with a bright or round face, like a full moon, or else disappears; or, if she is visible, she appears horned, like a new moon; which phenomenon never could happen, if Venus did not turn round the sun and was not betwixt him and the earth; for since all the planets borrow their light from the sun, it is necessary that Venus' lucid face should be towards the sun; and when she appears fully illuminated, she shews the same face to the sun and the earth: whence at that time, she must be above or beyond the sun, for in no other position could her illumined face be wholly seen from the earth. Farther, when she disappears, or, if visible, appears horned, that face of hers which is towards the sun, is either wholly turned from the earth, or only a small part of it can be seen by the earth, and in this case, she must of necessity be betwixt us and the sun.

Besides the foregoing, there is another argument to prove that Venus turns round the sun in an orbit that is within the earth's because she is always observed to keep near the sun, and in the same quarter of the heavens that he is in, never receding from him more than about  $\frac{1}{3}$  of a whole circle, and therefore she can never come in opposition to him: which would necessarily happen, did she perform her course round the earth either in a longer or shorter time than a year.

And this is the reason why Venus is never to be seen near midnight, but always either in a morning or evening, and at most not above 3 or 4 hours before sun-rising or sun-setting.

From the time of Venus's superior conjunction, (or when she is above the Sun) she is more easterly than the Sun, and therefore sets later, and is seen after sun-setting, and then she is commonly called the Evening-star; but from the time of her inferior conjunction, till she comes again to the superior, she then appears more westerly than the sun, and is only to be seen in the morning, before sun-rising, and is then called the Morning-star.



After the same manner we prove that Mercury turns round the sun, for he always keeps in the sun's neighbourhood, and never recedes from him so far as Venus does; and therefore the orbit of Mercury must lie within that of Venus: and on account of his nearness to the sun, he can seldom be seen without a telescope.

Mars is observed to come in opposition, and likewise to have all other aspects with the sun; he always preserves a round, full and bright face, except when he is near his quadrature aspect, when he appears somewhat gibbous, like the moon three or four days before or after the full; therefore the orbit of Mars must include the earth within it, and also the sun: for if he was betwixt the sun and us, at the time of his inferior conjunction, he would either quite disappear, or appear horned, as Venus and the moon do in that position.

Mars, when he is in opposition to the sun, looks almost seven times larger in diameter, than when he is in conjunction with him; and therefore must needs be almost seven times nearer to us, in one position, than in the other: for the apparent magnitudes of far distant objects increase or decrease in proportion to their distance from us; but Mars keeps always nearly at the same distance from the Sun; therefore it is plain, that it is not the earth but the sun, which is the centre of his motion.

It is proved in the same way, that Jupiter and Saturn have both the sun and the earth within their orbits, and that the sun, and not the earth, is the centre of their motions; although the disproportion of the distance from the earth is not so great in Jupiter as in Mars, nor so great in Saturn as it is in Jupiter by reason that they are at a much greater distance from the sun.

We have now shewn, that all the planets turn round the sun, and that Mercury and Venus are included between him and the earth: whence they are called the inferior planets; and that the earth is placed between the orbits of Mars and Venus, and therefore included between the orbits of Mars, Jupiter, and Saturn; whence they are called the superior planets; and since the earth is in the middle of these moveable bodies, and is of the same nature with them, we may conclude, that she has the same sort of motions, but that she turns round the sun is proved thus.

All the planets seen from the earth appear to move very unequally; as sometimes to go faster at other times slower, and sometimes to be stationary, or not to move at all; which could not happen if the earth stood still.



The annual periods of the planets round the sun are determined by carefully observing the length of time since their departure from a certain point in the heavens, (or from a fixed star), until they arrive to the same place again. By these sort of observations, the ancients determined the periodical revolutions of the planets round the sun; and were so exact in their computations, as to be capable of predicting eclipses of the sun and moon; but since the invention of telescopes, astronomical observations are made with greater accuracy, and of consequence our tables are far more perfect than those of the ancients.

And in order to be as exact as possible, astronomers compare observations made at a great distance of time from one another, including several periods: by which means the error that might be in the whole is in each period subdivided into such little parts, as to be very inconsiderable. Thus, the mean length of a solar year is known even to seconds.

The diurnal rotation of the planets round their axis was discovered by certain spots which appear on their surfaces: these spots appear first on the margin of the planets disks, (or the edge of their surfaces) and seem by degrees to creep towards their middle; and so on, going still forward till they come to the opposite side or edge of the disk, where they set or disappear; and after they have been hid for the same space of time that they were visible, they again appear to rise, in or near the same place, as they did at first; then to creep on progressively, taking the same course as they did before. These spots have been observed on the surfaces of the Sun, Venus, Mars, and Jupiter; by which means it has been found that these bodies turn round their own axis, in the times before mentioned.

It is very probable, that Mercury and Saturn have likewise a motion round their axis, that all the parts of their surface may alternately enjoy the light and heat of the Sun, and receive such changes as are proper and convenient for their nature; but by reason of the nearness of Mercury to the Sun, and Saturn's immense distance from him, no observations have hitherto been made, whereby their spots (if they have any) could be discovered, and therefore their diurnal motions cannot be determined. The diurnal motion of the earth is concluded to exist from the apparent revolution of the heavens, and of all the stars round it, in the space of a natural day. For it is much easier to conceive that this comparatively small Globe, should turn round its own axis, once in 24 hours, than that such a greater number of much larger bodies,

dies, some of them so immensely distant, should revolve round in so short a space of time. The solar spots do not always remain the same, but sometimes old ones vanish, and afterwards others succeed in their room; sometimes several small ones gather together, and make one large spot; and sometimes a large spot is seen to be divided into many small ones. But notwithstanding these changes, they all turn round with the sun in the same time.

Each planet is observed always to pass through the constellations Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricornus, Aquarius, Pisces, and it also appears that every one has a tract peculiar to itself; whereby the paths of the six planets, form among the stars a kind of road, which is called the Zodiac; the middle path whereof called the ecliptic, is the orbit described by the earth, with which the orbits of the other planets are compared.

As the ecliptic runs through 12 constellations, it is supposed to be divided into 12 equal parts, of 30 degrees each called Signs, having the same name with the twelve constellations they run through.

The plane of the ecliptic is supposed to divide the celestial sphere into two equal parts, called the northern and southern hemispheres; and a body situate in either of these hemispheres, is said to have north or south latitude according to the hemisphere it is in: So that the latitude of a celestial object is its nearest distance from the ecliptic.

The planes of the other five orbits are observed to lie partly in the northern and partly in the Southern hemisphere; so that every one cuts the ecliptic in two opposite points, called Nodes; one called the ascending node, is that through which the planet passes, when it moves out of the southern into the northern hemisphere; and the other called the descending node, is that through which the planet must pass, in going out of the northern into one of the southern hemispheres.

The right line joining the two nodes of any plane, is called the line of the nodes.

The names to most of the constellations were given by the ancient astronomers, who reckoned that star in Aries, now marked  $\gamma$ , (according to Bayer) to be the first point in the ecliptic, this star being next to the sun when he entered the vernal equinox; and at that time each constellation was in the sign by which it was called: But observations shews, that the point marked in the heavens by the vernal equinox, has  
been

been constantly going backwards, by a small quantity every year; whereby the stars appear to have advanced as much forwards, so that the constellation Aries is now almost removed into the sign Taurus: the said first star in Aries being got almost 30 degrees forwards from the equinox; which difference is called the procession of the equinoxes; whereof the yearly alteration is about 50 seconds of a degree; or about a degree in 72 years.

All the planets have one common focus in which the sun is placed: For as no other supposition can solve all the appearances that are observed in the motion of the planets, and as it also agrees with the strictest physical and mathematical reasoning; therefore it is now received as an elementary principle.

The line of the nodes of every planet passes through the sun; for as the motion of every planet is in a plane passing through the sun, consequently the intersections of these planes that is, the lines of the nodes, must also pass through the sun.

All the planets in their revolutions are sometimes nearer, sometimes farther from the sun: this is a consequence of the sun not being placed in the centre of each orbit, the orbits being ellipsis.

The aphelion or superior apsis, is that point of the orbit which is farthest distant from the sun; and the perihelion, or inferior apsis, is that point which is nearest the sun: and the transverse diameter of the orbit, or the line joining the two apses, is called the Line of the apses or apsides.

The planets move faster as they approach the sun, or come nearer to the perihelion; and slower as they recede from the sun, or come nearer the aphelion: This is not only a consequence from the nature of the planets motions about the sun, but is confirmed by all good observations.

If a right line be drawn from the sun, through any planet (which line is called by some the Vector Radius) and be supposed to revolve round the sun with the planet, then this line will describe, or pass through every part of the plane of the orbit, so that the Vector Radius may be said to describe the area of the orbit.

There are two chief laws observed in the Solar system which regulate the motions of all the planets, namely,

I. The planets describe equal areas in equal times; *i. e.* in equal proportions of time; the Vector Radius describes the equal areas or portions of the space contained within the planets orbit.

II. The squares of the periodical times of the planets are

as the cubes of the mean distances from the sun : That is as the square of the time which a planet, A, takes to revolve in its orbit, is to the square of the time taken by any other planet, B, to run through its orbit ; so is the cube of the mean distance of A from the sun, to the cube of the mean distance of B from the sun.

The mean distance of a planet from the sun, is its distance from him, when the planet is at either extremity of the conjugate diameter ; and is equal to half of the transverse diameter.

The foregoing laws are the two famous laws of Kepler a great astronomer, who flourished in Germany about the beginning of the 17th century, and who deduced them from a multitude of observations : but the first who demonstrated these laws, was the incomparable Sir Isaac Newton.

By the second law, the relative distances of the planets from the sun are known ; and was the real distance of any one known, the absolute distances of all the others would thereby be obtained.

Besides the planets, already mentioned, there are other great bodies that sometimes visit our system, which are a sort of temporary planets ; for they come and abide with us for a while and afterwards withdraw from us for a certain space of time, after which they again return. These wandering bodies are called *Comets*.

The motions of the comets in the heavens, according to the best observations hitherto made, seem to be regulated by the same immutable law with the planets ; for their orbits are elliptical, like these of the planets, but vastly narrower or more eccentric. Yet they have not all the same direction with the planets, who move from west to east, for some of the comets move from east to west ; and their orbits have different inclinations to the earth's orbit ; some inclining northwardly, others southwardly, much more than any of the planetary orbits do.

Although both the comets and the planets move in elliptic orbits, yet their motions seem to be vastly different ; for the eccentricities of the planets orbits are so small, that they differ but little from circles ; but the eccentricities of the comets are so very great, that the motions of some of them seem to be almost in right lines tending directly towards the sun.

Now, since the orbits of the comets are so extremely eccentric, their motions when they are in their Perihelia, or nearest distance from the sun, must be much swifter than when they



they are in their aphelia, or farthest distance from him ; which is the reason why the comets make so short a stay in our system ; and when they disappear, are so long in returning.

The figures of the comets are observed to be very different ; some of them send forth small beams, like hair every way round them ; others are seen with a long fiery tail, which is always opposite to the sun. Their magnitudes are also very different, but in what proportion they exceed each other is as yet uncertain. Nor is it probable that their numbers are yet known, for they have not yet been observed with due care, nor their theories discovered, but of late years. The ancients were divided in their opinions concerning them ; some imagined that they were only a kind of meteors, kindled in our atmosphere, and were there again dissipated ; other took them to be some ominous prodigies. But modern discoverers prove, that they are worlds, subject to the same laws of motion as the planets are ; and they must be very hard and durable bodies, else they could not bear the vast heat, which some of them when in their perihela receive from the sun, without being utterly consumed. The great comet which appeared in the year 1680, was within one sixth part of the sun's diameter from his surface ; and therefore its heat must be prodigiously intense, beyond imagination : and when it is at its greatest distance from the sun, the cold must be as rigid.

The fixed stars are those bright and shining bodies which in a clear night, appear to us every where dispersed through the boundless regions of space. They are termed fixed, because they are found to keep the same immutable distance, in all ages, without having the motions observed in the planets. The fixed stars are all placed at such immense distances from us, that the best telescopes represent them no bigger than points, without having any apparant diameters.

It is evident from hence, that all the stars are luminous bodies, and shine with their own proper and native light also they could not be seen at such a great distance. For the satellites of Jupiter and Saturn, though they appear under considerable angles through good telescopes, yet are altogether invisible to the naked eye.

Although the distance betwixt us and the sun is vastly large, when compared to the diameter of the earth, yet it is nothing when compared with the prodigious distance of the fixed stars for the whole diameter of the earth's annual orbit appears from the nearest fixed star no bigger than a point, and the fixed star at least 100,000 times farther from us than we are from the sun.

sun, as may be demonstrated from the observations of those who have endeavoured to find the parallax of the earth's annual orbit, or the angle under which the earth's orbit appears from the fixed stars.

Hence it follows, that though we approach nearer to some fixed stars at one time of the year than we do the opposite, and that by the whole length of the diameter of the earth's orbit; yet this distance being so small in comparison with the distance of the fixed stars, their magnitude or positions cannot thereby be sensibly altered, Therefore we may always without error suppose ourselves to be in the same centre of the heavens, since we have always the same visible prospect of the stars without any alteration.

If a spectator was placed as near to any fixed star as we are to the sun, he would there observe a body as big, and every way like, as the sun appears to us; and our sun would appear to him no bigger than a fixed star; and undoubtedly he would reckon the sun as one of them, in numbering the stars, Wherefore, since the sun differeth nothing from a fixed star, the fixed stars may be reckoned as so many suns.

It is not reasonable to suppose that all the fixed stars are placed at the same distance from us; but it is more probable that they are every where interspersed, through the vast indefinite space of the universe; and that there may be as great a distance betwixt any two of them, as there is betwixt our sun and the nearest fixed star. Hence it follows why they appear to us of different magnitudes, not because they are really so, but because they are at different distances from us; those that are nearest, excelling in brightness and lustre those that are more remote, who give a fainter light, and appear smaller to the eye.

The astronomers distribute the stars into several orders or classes; those that are nearest to us, and appear brightest to the eye, are called stars of the first magnitude; these that are nearest to them in brightness and lustre, and called stars of the second magnitude; those of the third class are stiled stars of the third magnitude; and so on, until we come to the stars of the sixth magnitude, which are the smallest that can be discerned by the naked eye. There are infinite numbers of smaller stars that can be seen through telescopes; but these are not reduced to any of the six orders, and are only called telescope stars. It may here be observed that though the astronomers have reduced all the stars that are visible to the naked eye, into some one or other of these classes; yet we are not to conclude from thence, that all these stars answer exactly

to some or other of these orders; but there may be in reality as many orders of the stars as they are in number, few of them appearing of the same bigness and lustre.

The ancient astronomers, that they might distinguish the stars, in regard to their situation and position to each other, divided the whole starry firmament into several asterisms or systems of stars, consisting of those that are near to one another. These asterisms are called constellations, and are digested into the forms of some animals, as men, lions, bears, serpents, &c. or to the images of some known things, as of a crown, a harp, a triangle, &c.

The starry firmament was divided by the ancients into forty eight images or constellations; twelve of which they placed in that part of the heavens wherein are the planes of the planetary orbits; which parts is called the zodiac, because most of the constellations placed therein resemble some living creature. The two regions of the heavens on each side of the zodiac, are called the north and south part of the heavens.

The constellations, within the zodiac, are; 1. Aries, the ram; 2. Taurus, the bull; 3. Gemini, the twins; 4. Cancer, the crab; 5. Leo, the lion; 6. Virgo, the virgin; 7. Libra, the balance; 8. Scorpio, the scorpion; 9. Sagittarius, the archer; 10. Capricornus, the goat; 11. Aquarius, the water-bearer; and 12. Pisces, the fishes.

The constellations on the north side of the zodiac are thirty-six, viz. The little bear; the great bear; the dragon; Cæpheus, a king of Ethiopia; the greyhounds; bootes; the keeper of the bear; mons Menelaus; Bernice's hair; Charles's heart; the northern crown; Hercules with his club watching the dragon; Cerberus; the harp; the swan; the fox; the goose; the lizard; Cassiopeia; Perseus; Andromeda; the great triangle; the little triangle; Auriga; Pegasus, or the flying horse; the dolphin; the eagle; serpentarius the serpent; Sobieski's shield; camelopardus; Antinous; the colt; the linx; the little lion; and Musca.

The constellations noted by the ancients on the south side of the zodiac, were the whale, the river Eridanus, the hare, Orion the great dog, little dog, the ship Argo, Hydra, the centaur, the cup, the crow, the wolf, the southern crown, and the southern fish. To these have been lately added the following, viz. The phoenix, the crane, the peacock, Noah's dove, the Indian, the bird of paradise, Charles's oak, the southern triangle, the fly, the bee, the swallow, the Chameleon, the flying fish, Toucan, or the American-goose, the water serpent and the sword fish.

The ancients placed these particular constellations or figures in the heavens, either to commemorate the deeds of some great man, or some notable exploit or action; or else took them from the fables of their religion, &c. And the modern astronomers do still retain them, to avoid the confusion that would arise by making new ones, when they compare the modern observations with the old ones.

Some of the principal stars have particular names given them, as *Syrius*, *Arcturus*, &c. There are also several stars that are not reduced into constellations, and these are called *unformed stars*.

Besides the stars visible to the naked eye, there is a very remarkable space in the heavens, called the *galaxy*, or *milky way*; this is a broad circle of a whitish-hue, like milk, going quite round the whole heavens; and consisting of an infinite number of small stars, visible through a telescope, though not discernable by the naked eye, by reason of their exceeding faintness, yet with their light, they combine to illustrate that part of the heavens where they are, and to cause that shining whiteness.

The places of the fixed stars, or their relative situations one from another, have been carefully observed by astronomers, and digested into catalogues. The first among the Greeks, who reduced the stars into a catalogue, was *Hypparcus*, who from his own observation, and of those who lived before him, inserted 1022 stars into his catalogue, about 120 years before the Christian æra; this catalogue has been since enlarged and improved, by several learned men, to the number of 3000 of which there are a great many telescopic, and not to be discerned by the naked eye; and these are all ranked in the catalogue as stars of the seventh magnitude.

It may seem strange to some, that there are no more than this number of stars visible to the naked eye; for sometimes in a clear night, they seem to be innumerable. But this is only a deception of our sight arising from their vehement sparkling, while we look upon them confusedly, without reducing them into any order; for there can seldom be seen above 1000 stars in the whole heavens with the naked eye at the same time: and if we should distinctly view them we shall not find many but what are inserted upon a good celestial globe.

Although the number of stars that can be discerned by the naked eye are so few, yet it is probable there are many more, which are beyond the reach of our optics; for thro' telescopes they appear in vast multitudes every where dispersed through



out the whole heavens; and the better our glasses are, the more of them we still discover. The ingenious Dr Hook has observed 78 stars in the Pleiades, of which the naked eye is never able to discern above seven; and in the Orion which has but 80 stars in the British catalogue, (and some of them telescopic) there has been numbered 2000 stars.

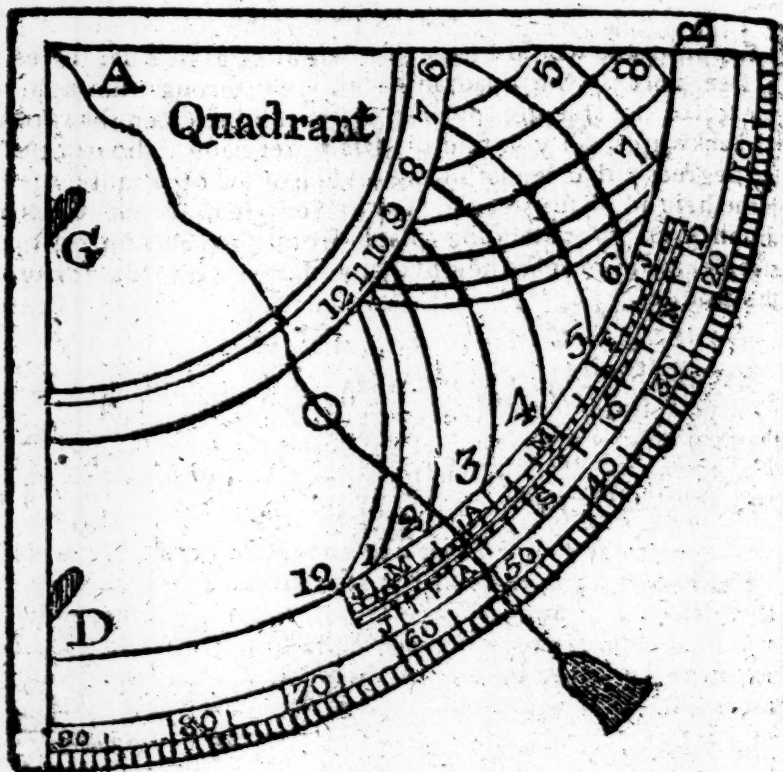
Those who think that all these glorious bodies were created for no other purpose than to give us a little dim light, must entertain a very slender idea of the divine wisdom; for we receive more light from the moon itself than from all the stars put together.

And since the planets are subject to the same laws of motion with our earth, and some of them not only equal to, but vastly exceed it in magnitude, it is not unreasonable to suppose, that they are all habitable world's. And since the fixed stars are no way behind our sun, either in bigness or lustre; it is not probable that each of them have a sistem of planetary worlds turning round them, as we do round our sun? and if we ascend as far as the smallest star we can see, shall we not then discover innumerable more of these glorious bodies which now are altogether invisible to us; And so *ad infinitum*, through the boundless space of the universe. What a magnificent idea, must this raise in us, of the Divine Being! who is every where, wisdom and goodness, amongst all his creatures.

The next thing I shall proceed to is, to describe and speak of the use of a very necessary instrument called a Quadrant, the shape of which is here represented.

Aa. 2.

Quadrant



This Quadrant, or quarter of a circle, is variously useful on sundry accounts, viz. to take heights and distances, whether accessible or inaccessible. To find the hour of the day &c.

*Its description.*

The outward arch is divided into 90 parts or degrees, (being the fourth part of the circle of the sphere) and figured from 10, to 20, &c. to 90, above which figures are letters signifying the 12 calendar months in the year, J. for January, F for February, &c. And again, over those letters for the month are lines to know the hour of the day: and on the line GD, are sights of thin brass to be spied through, or for the sun to shine through, from one to the other. Lastly, in the middle of the point of the quadrant, viz. at A is a line or thread of silk fixed through a hole with a plummet of lead at the end of it, and also a small bead in the middle.

Some of the many uses of this instrument are as follows:

Of

Of height.

Suppose you would know the height of a steeple, tower, or tree, hold up the quadrant, and view through the sights the top of the steeple, tower, or tree, and then step forwards or backwards, till you find the Plummet hang at liberty just 45 degrees; that is just in the middle of the quadrant; then is the height of the steeple, tower, or tree, equal to the distance of your standing place from the bottom of the steeple, adding for the height that you hold the quadrant from the ground.

To find the hour of the day.

Lay the thread just upon the day of the month, then hold it till you slip the small bead, or pin's head to rest on one of the 12 o'clock lines; then let the sun shine from the sight at G to to the other at D, the plummet hanging at liberty the bead will rest on the hour line of the day.

To find the latitude of a place nearly.

Hold up the quadrant, and through the sights thereof (or along the edge) spy, in a clear star-light night, the north pole star; the plummet hanging at liberty, the thread will rest on the degrees of latitude of the place you are in, or where you take your observation.

The Extraction of the Square and Cube Roots, of great use in measuring, guaging, &c.

The square root.

1st, **A** SQUARE number ariseth from the multiplication of a number into itself, the number so multiplied being called the Root; thus 4 multiplied by 4, produceth 16; so 16 is a square number, and 4 is the root thereof: so also 4 is the square of 2, for twice 2 is 4, and 9 is the root of 81, for 9 times 9 is 81, &c.

2dly, To extract the square root of any number, is to find another number, which multiplied by (or into) itself produces the number given; and after the root is found, such a multiplication is a proof of the work.

3dly, Square numbers are either single or compound.

4thly, All the single square numbers, with their respective roots are contained in the following table, viz.

|         |   |   |   |    |    |    |    |    |    |
|---------|---|---|---|----|----|----|----|----|----|
| Roots   | 1 | 2 | 3 | 4  | 5  | 6  | 7  | 8  | 9  |
| Squares | 1 | 4 | 9 | 16 | 25 | 36 | 49 | 64 | 81 |

A a 3

5thly.

5thly, When the square root of any number less than 200 is required, and that number is not expressed in the table above; then you are to take the root of that square number in the table, which (being less) comes nearest to the given number: Thus if the square root of 50 were required, then, since 49 is the nearest square number in the table, therefore its root, 7, will be the given number nearly.

6thly, A compound square number is that which is produced by a number consisting of more places than one, multiplied by itself, and is never less than 100: so 729 is a compound square number produced by the multiplying 27 into itself.

7thly, The root of any number under 100 may be easily known by the foregoing table of single squares: to extract the root of a compound number of several places, observe the following directions.

**Example I.**

Let the square root of the number 45796 be required.

1. Set a point over the place of units thus, 45796 and so successively over every second figure towards the left hand,

as thus, 45796; and thus 45796. But in decimals you must point from the place of units towards the right hand, omitting one place, as above; and if the place of decimals are odd, affix a cypher towards the right hand of them to make them even. Your number thus prepared, draw a crooked line on the right of the number, as in division: and indeed, the operation of the square root is not much unlike division; only there the divisor is fixed, and in the square root we are to find a new one for each operation. I say having made a crooked line thus, 45796 (seek in the foregoing table for the nearest square to the first point on the left hand, which here is 4, the root of which is 2 which root place on the right hand of the crooked line, and set its square 4 under the said point, as below.

45796(2

4

057

Then subtract it, there remains nothing 0: To the remainder bring down the next point 57, thus:



$$\begin{array}{r} \dots \\ 45796 \text{ (2} \\ 4 \end{array}$$

4

057

Which call the resolvend; then double the root of the first point, and place it on the left hand of the resolvend, thus:

$$\begin{array}{r} \dots \\ 45796 \text{ (21} \\ 4 \end{array}$$

4

057

Call the 4 the double of the root 2, thus place it on the left hand of the crooked line, the divisor, and seek how often 4, the divisor, can be taken in 5, the first figure of the resolvend 57. (for if you are to omit the last figure toward the right hand which here is once, place one to the right of the root 2, and also of the divisor 4, thus;

$$\begin{array}{r} \dots \\ 45796 \text{ (21} \\ 4 \end{array}$$

4

41) 057

Then multiply the divisor (now 41) by the figure last placed in the root, viz. 1, place it under the resolvend, and subtract it therefrom.

$$\begin{array}{r} \dots \\ 45796 \text{ (21} \\ 4 \end{array}$$

4

41) 057

41

16

Then bring down the next point, viz. 96; and place it on the right of the remainder 16, for a new resolvend or dividend. thus; Next double the quotient, or part of the root, viz. 21, and place it for a new divisor to the new resolvend 1696, thus:

$$\begin{array}{r} \dots \\ 45796 \\ 4 \end{array}$$

$$\begin{array}{r} 41) 057 \\ 41 \end{array}$$

$$42) 1696$$

Then seek how oft 42 in 169 : (still reserving or omitting the unit figure of the resolvend or dividend as aforesaid) and I find I can have it 4 times, which 4 I place in the quotient and in the divisor, and proceeding as before, the work will appear thus:

$$\begin{array}{r} \dots \\ 45796 \text{ (214 Root.} \\ 4 \end{array}$$

$$\begin{array}{r} 41) 057 \text{ Resolvend.} \\ 41 \end{array}$$

$$\begin{array}{r} 424) 1696 \text{ Resolvend,} \\ 1696 \text{ Product.} \end{array}$$

(0)

In the last operation, I place 4 in the root, and likewise in the divisor 42, which makes the new divisor 424, to the resolvend 1696; which divisor multiplied by 4, the figure placed in the root, produces 1696; equal with the dividend or resolvend aforesaid, as above may be seen. Therefore the square root of 45796, the number whose square was sought.

Example II. What is the square root of 13299049 (3307 Root.

$$\begin{array}{r} 9 \\ \text{1st Divisor 65) 329 Resolv.} \\ 325 \text{ Product.} \end{array}$$

$$\begin{array}{r} \text{2d Divisor 700) 90 Resolv.} \\ 000 \text{ Product.} \end{array}$$

$$\begin{array}{r} \text{3d Divisor 7007) 49049 Resolv.} \\ 49049 \end{array}$$

(0)

Example

Example III. performed Decimally.

$$\begin{array}{r}
 160,000000 \quad 49 \text{ Root.} \\
 \text{1st Divisor } 22 \overline{) 069} \\
 \underline{44} \\
 \text{2d Divisor } 246 \overline{) 1600} \\
 \underline{1476} \\
 \text{3d Divisor } 2574 \overline{) 12400} \\
 \underline{10096} \\
 \text{4th Divis. } 25289 \overline{) 230400} \\
 \underline{227621} \\
 279
 \end{array}$$

Note, That when the divisor cannot be had in the resolvend, then place a cypher in the quotient. and also on the right of the divisor, and then bring down the next square, &c. as in the second example just given may be seen.

Note further, If any remainder happen to be after extraction, you may proceed by annexing pairs of cyphers to the left of the given number, and so come to what exactness you please.

Note also, Such numbers given for extraction that leave remainders, are by some called irrationals, because their roots cannot be exactly discovered, but still there will something remain, though you work by whole numbers or fractions. As in the example above, where the remainder is 279.

The extraction of the cube root.

TO extract the cube root of any number is to find another number, which multiplied by itself, and that product by the number found, produces the given number for extraction.

All single cube numbers, with their respective roots, are contained in the following table.

| Roots. | 1 | 2 | 3  | 4  | 5   | 6   | 7   | 8   | 9   |
|--------|---|---|----|----|-----|-----|-----|-----|-----|
| Cubes. | 1 | 8 | 27 | 64 | 125 | 216 | 343 | 512 | 729 |

1st, To prepare any number for extraction, make a point over unity, and so successively over every third figure towards the left hand in integers, missing two between each point: but in places you must point from the place of units to the right hand, &c.

Example

Example. Extract the cube root of 46656 prepared thus, as above directed :

46656

Here are but two points, therefore the root will have but two places.

2dly, the number being prepared, seek in the foregoing table the nearest root to the first point or period 46, which you will find to be 3, which place in the quotient, thus,

46656(3; the cube whereof is 27, which place under your first period 46 as in the margin; subtract . . it from 46 and there rests 19; this is your first work, and no more to be repeated. 27  
Then to the remainder 19, bring down the next period, viz. 656 (which is the last), and place on the right of the remainder 19, 19.

46656(3:  
27

19646 Resolv.

Then draw a line under the resolvend : next square the 3 placed in the quotient : which makes 9 ; which multiplied by 300 makes 2700 for a divisor, which place accordingly thus:

46656(3:  
27

2400)19656

Then seek how often 2 in 19? Answer but 6 times; because of the increase that will come from the quotient, and place 6 in the quotient; then multiply the divisor, by 6, and the product will be 16200; which place orderly under the resolvend thus :

46656(36  
27

19656

16200

Then proceed to find the increase coming from the quotient thus; square your last figure 6 and it makes 36: which multiplied by 3, the other figure of the quotient, it gives 108 which multiplied by 30, make 3240. This place also orderly under the last number before set down, viz. 16200, and the work will appear thus :



$$\begin{array}{r}
 46656 \text{ (36)} \\
 \underline{27} \\
 2700) 19656 \\
 \underline{16200} \\
 3240
 \end{array}$$

Then cube the figure last placed in the quotient, viz. 6, and it makes 216; which place orderly likewise under the line 3243; add the three lines together, and they make 19656; which is equal to the resolvend above, viz. 19656, and there being no more periods to bring down, I see the work finished, and find the cube root of 46656 to be 36.

This will appear to be true if the root 36 be multiplied by 36, and that product by 36 again, for then the result will be 4676, as in the following operation.

$$\begin{array}{r}
 36 \\
 36 \\
 \hline
 216 \\
 108 \\
 \hline
 1296 \\
 36 \\
 \hline
 7776 \\
 3888 \\
 \hline
 \end{array}$$

46656 Proof.

### Some Uses of the Square and Cube Roots.

1. To find a mean proportional between two numbers.

**Rule.** THE square roots of the product of the given numbers in the mean proportional sought; so the mean proportional between 46 and 64 will be 32, for 16 multiplied by 64 produces 1024, and the square of 32 is also 1024. This is of use in finding the side of a square equal to any parallelogram rhombus, rhomboides, triangular or regular polygon.

2. To find the side of a square equal to the area of a given superficies.

**Rule.** the square root of the content of any given superficies of the side of the square. — So if the content of a given circle

circle be 160, the side of the square equal will be 12,649.  
See page 223.

3. The area of a circle being given, to find the circumference. See page 225.

4. The area of a circle being given, to find the diameter.

5. Any two sides of a right angled triangle being given to find the third side.

This depends upon a mathematical proposition, in which it is proved, that the square of the hypotenuse, or longest side of a right angled triangle, is equal to the sum of the square of the base and perpendicular, that is of the other two sides.

See Figure XHI.

Case 1. Let the base or ground A B represent the breadth of a moat or ditch, and the perpendicular B C the height of a castle, tower, or city-wall; and the hypotenuse, A C, the length of a scaling ladder.

In this figure, the base A B is supposed to contain 40 yards; and the perpendicular, or height of the tower or wall, 30 yards; what length will the hypotenuse, A C, at the scaling ladder be?

Rule. The square root of the sum of the squares of the base and perpendicular, is the length of the hypotenuse. See the work.

1600 the square of the base 40.

900 the square of the perpendicular 30.

The sum 2500 (50 yards the root or length of the scaling ladder.

(9)

Case 2. If the length of the base, or breadth of the ditch were required; then the square root of the difference of the squares of the hypotenuse and perpendicular is the length of the base, or breadth of the ditch or moat. See the work.

2500 the square of the hypotenuse, A C.

900 the square of the perpendicular B C.

The differ. 1600 (40 yards, the root or breadth of the ditch.

(0)

Case 3. If the height of the tower or perpendicular B C were required, then the square root of the difference of the squares

squares of the hypothenuse and base, is the height of the perpendicular B C.

6. Any number of men being given to be formed into a square battalion, to find the number of rank and file.

Rule. The square root of the number of men given, will be the number of men to be placed in rank and file.

Example. Admit an army of 32400 men were to be formed into a square battalion, the square root of 32400 will be found to be 180, and so many men must be placed in rank, and also in file.

7. To find the side of a square, polygon, or the diameter of a circle, which shall be, to any other given square, similar polygon, or circle, in a given proportion.

Rule. Since like surfaces are to each other, in a duplicate proportion of their like side; therefore,

As the given circle, square or polygon,

Is to the required circle, square or polygon :

So is the square of the diameter or side of the first,

To the square of the diameter or side of the second.

Then the square root of the result of the above proportion will be the diameter or side required.

Example 1. There is a circle whose diameter is 11; what will the diameter of that circle be, whose area, is 4 times the area thereof?

Here 11 times 11 is 121; and

As 1 ———— 4 :: ———— 121

4

484 22 the answer.

4

42) 84

84

Example 2. There are two similar polygons, whose areas are as 9 to 25, and the side of the lesser is 12 yards; what is the side of the greater? here 12 times 12 is 144; and

B b

As

$$\begin{array}{r}
 \text{As } 9 \text{ --- } 25 \text{ --- } 144 \\
 \phantom{\text{As } 9 \text{ --- } 25 \text{ --- }} 25 \\
 \hline
 \phantom{\text{As } 9 \text{ --- } 25 \text{ --- }} 720 \\
 \phantom{\text{As } 9 \text{ --- } 25 \text{ --- }} 288 \\
 \hline
 9) 3600
 \end{array}$$

400 (20 the Answer.

4

600

8. *The uses of the cube root are to find out the dimensions of like solids, as globes, cylinders, cubes, &c.*

Rule. Since like solids are to each other, as the cubes of their like sides or diameters; therefore,

As the content or weight of a given solid,

To the content or weight of another like solid :

So is the cube of the side or diameter of the one,

To the cube of the side or diameter of the other.

Then the cube root of the result will be the length of the side or diameter required.

Example 1. If a bullet that weighs 72 lb. is 8 inches in diameter, what will be the diameter of that bullet that weighs 9 lb. Here the cube of 8 is 512; and

$$\text{As } 72 \text{ --- } 9 \text{ --- } 512$$

9

$$72) 4608 (64$$

432

288

288

Then the cube root of 64, viz. 4, is the diameter required.

Example 2. If a ship of 100 tons be 44 feet long at the keel, of what length must the keel of a ship be that carries 220 tons?

Say, as 100 is to 220; so is the cube of 44, viz. 85184 to 187404.8 whose cuberoot is 57.226, the length of the keel sought.

Example 3. There is a cubical vessel whose side is 12 inches, and it is required to find the side of a vessel that holds 3 times



3 times as much. Here the cube of 12 is 1728, which multiplied by

3

produces

5184

the cube root of which is 17,386; the answer required, or the side sought.

*An easy rule to find the length of a mast of a ship, viz.*

Two-thirds the length of the keel, and the breadth of the beam, is the length of the main mast; and the rule is therefore, to multiply the length of the keel by 2, and to divide the product by 3, and then to the quotient add the breadth of the beam, and the total is the length of the main mast.

*Example.* Suppose a ship to be 108 feet by the keel and 40 feet by the beam, what is the length of the main mast

108.

2

3) 216

Add { 72 two thirds of the keel.  
40 the breadth of the beam.

112

*Answer.* The length of the main mast is 112 feet, as in the work.

Again, admit a ship is 84 feet by the keel, and 31 feet by the beam, what is the length of her main mast?

84 per keel.

2

3) 168

Add { 56 two thirds of the keel.  
31 the breadth of the beam.

*Answer.* 87 feet the length of the main mast.

*Another way to find the length and thickness of masts and yards:*

The way to find the length of the main mast is to add the breadth of the beam, and the depth of the hold, in feet together, and divide the total by 1,5, and the quotient will be the length of the main mast, in yards.

*Example.* Admit a ship whose keel in length is 73 feet,

B b. 2

and

and the breadth of the beam 28,5 feet, and the depth of the hold 12 feet what is the length of the main mast?

28,5 feet breadth of the beam.

12,0 depth of the hold.

1,5)40,5 (27 yards Answer.

30

105

105

(0)

Answer. 27 yards or 81 feet, as per work.

To find the thickness of the mast, having the length, say, by the rule of proportion (or rule of three) If 84 feet long require 28 inches thick, what will 81 feet long r as in the following work.

|       |            |       |
|-------|------------|-------|
| F. L. | In. thick. | F. L. |
| 84    | 28         | 81    |

81

28

224

84) 2268 (27 Inches thick. Answer.

168

588

588

(0)

## OF DIALING.

**D**IALING is a very ancient art, even as old as the time of king Hezekiah, where mention is made of the dial of Ahaz, in the second book of Kings, Chap. xx. ver. 11.

The gnomon, or substile of a post or horizontal dial, should point directly south, and its back will be then directly north; the south may be truly known by a good watch or clock, just at noon; for then the sun is always at the meridian, and makes just 12 o'clock; so that knowing the south, it will not be difficult to find the north, it being its opposite.

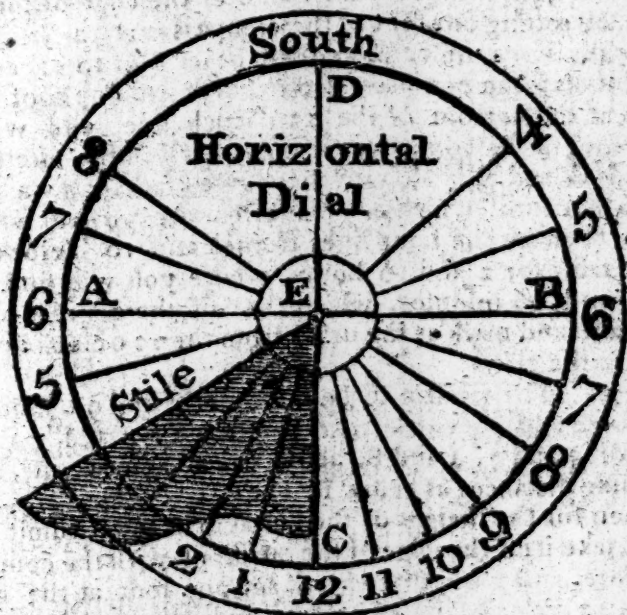
To

To fix a dial north and south.

Fasten your board on the top of a post, and then with your compasses make 4, 5, or 6 circles, one within the other, from the centre or middle; where place a large pin, perpendicular or upright, and nicely observe, when the sun shines in the forenoon, on which circle the head of the pin shadoweth; then there make a mark; and do the same in the afternoon when the shade of the pin's head comes on the same circle; and from the midway of the two marks, draw a line to the centre, on which place your meridian, or 12 o'clock line; so will the post dial point, north and south.

By a meridian line you may also know when the moon, or a star of magnitudē, comes to the south; which when they do, they are always at the highest, whether by night or day.

The following figure represents a horizontal dial.



First with a ruler draw the line A B; then cross it in the centre with another line, as the line C D, which is the meridian or 12 o'clock line; and the first line drawn, viz. A B is the six o'clock line: then open your compasses, and place one foot at the beginning of the degrees, or the arc edge of your quadrant; and extend the other foot to 60 degrees, and with that extent place one foot in the centre of the dial,

B b 3:

at

at E; where the two first lines cross one another, and draw the semicircle A C B.

Next having the twelve o'clock line E C, to know what distance must be set out from it, for 1 o'clock, and 11 o'clock being all one; be directed by the following small table, viz,

| 52 deg. |    | Lat.   |    |
|---------|----|--------|----|
| D. M.   |    | Hours. |    |
| 11      | 55 | 1      | 11 |
| 24      | 26 | 2      | 10 |
| 38      | 13 | 3      | 9  |
| 53      | 44 | 4      | 8  |
| 71      | 9  | 5      | 7  |

In the first column against 1 hour, and 11, you find 11 degrees and 55 minutes; which take of the edge of the quadrant, by setting one foot of the compasses at the beginning of the divisions under B, and the other foot to 11 degrees 55 minutes; the compasses so opened, set one foot in the circle at the bottom of the 12 o'clock line, and with the other foot of the compasses make a mark in the circle both towards A and B, and from those two marks draw a line towards the centre, which you may afterwards go over with ink. Then to make the hour lines from 2 and 10 o'clock, look in the table for 2 and 10 hours, where you will find 24 degrees and 26 minutes, which take of the degrees of your quadrant, and mark as the other from the 12 o'clock line both ways in the circle.

Note. The same is to be done for 3 and 9 o'clock, and also for 4 and 8 o'clock; and the like for 5 and 7 o'clock; and for 5 and 7, 4 and 8, above the 6 o'clock line, set off the same distances as below it.

Then for the height of the gnomon or stile, admit 52 degrees, take it off the edge of the quadrant with the compasses as before, and with that extent set one foot at the bottom of the 12 o'clock line as before, and extend the other foot in the circle, and make a mark, and then draw a line from thence to E in the centre, for the upper edge of the stile, and so raise it directly over the meridian or 12 o'clock line.

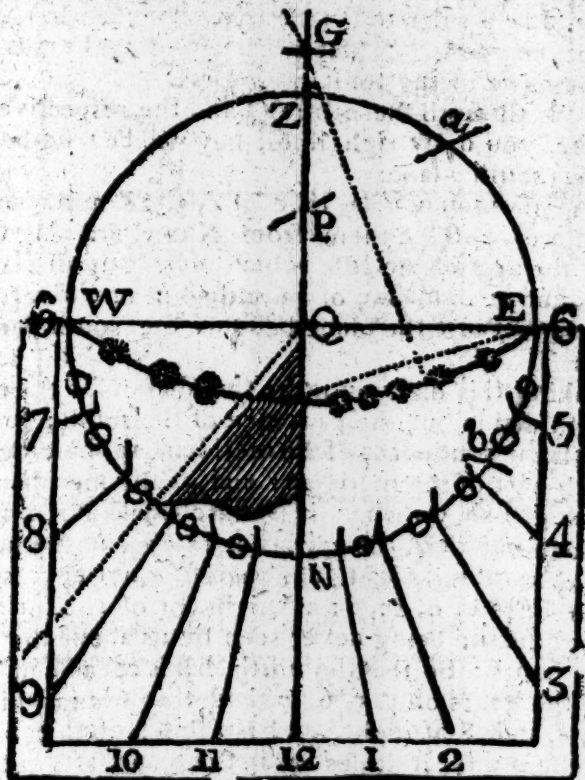
*Of upright planes.*

Those planes are said to be erect or upright which stand perpendicular to the horizon of the place, whose upper part pointeth to the zenith, and their lower part to the nadir; and



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Thirdly, Lay a ruler from W to *a* and it will cut the meridian Z N in the point P, the pole of the world; and a ruler also laid from W to *b*, will cut the meridian in A E, which is the point through which the equinoctial must pass; for the drawing of which, you have three points given, viz. E A E and W, and the centre will always be in the meridian line Z N.

### Fourthly

Fourthly, Divide the semi circle E N W into 12 equal parts, as the points O O O, &c.

Fifthly, Lay a ruler to Q and each of these points O O O, and the ruler will cross the equinoctial circle in the points \* \* \* &c. dividing that into 12 unequal parts.

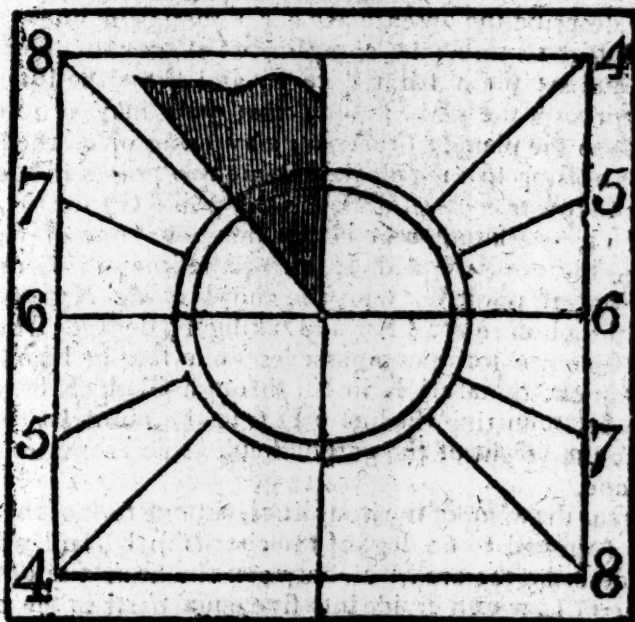
Sixthly, Lay a ruler to P (the pole of the world) and every one of the marks \* \* \* &c. and the ruler will cross the circle of the plane in the points | | | &c.

Lastly, If through the centre Q and the respective points | | | &c. you draw right lines, they will be true hour lines on an erect south plane.

For the gnomon or stile, take 38 deg. 28 min. out of the line of chords, and set them from N to e, drawing the line Q e, for the axis of the stile, which must hang directly over the meridian or hour line of 12, and point downwards to the south pole, because the plane beholds the south part of the meridian.

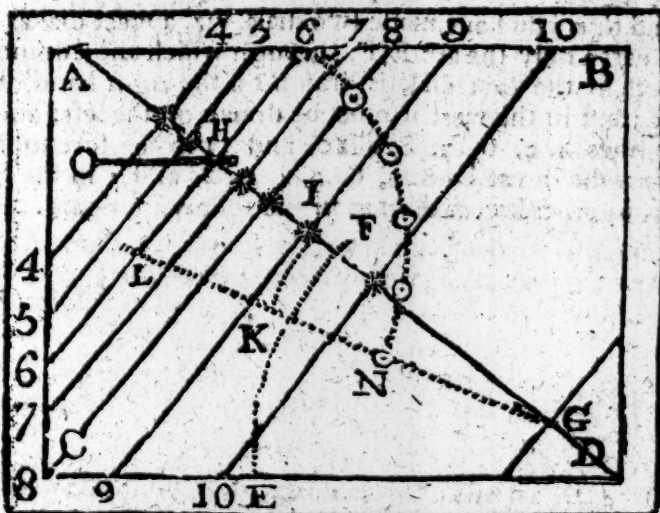
In making this dial you make two dials: for the erect direct north dial is but the back side of the south; for as this beholdeth the south part of the meridian, so the other faceth the north part of the meridian: and as the meridian line in the south dial shews when it is 12 o'clock at noon, so the back side thereof, viz, the north side represents the hour line, of 12 o'clock at midnight, and therefore not expressed, nor the hour lines of 9, 10, 11 at night, or of 1, 2, or 3, in the morning, the sun being never seen by us above the horizon at those hours: So that the north dial is capable of only receiving the hours of 4, 5, 6, 7, and 8 in the morning, and 4, 5, 6, 7, and 8 at night, and (in this latitude) not all of them neither; for it shines not in this plane, at 8 in the morning nor at 4 in the afternoon; but it is best to put them down as in the figure following, to know how much it is past 3 in the morning, and what it wants of 5 in the afternoon.

An erect direct north dial.



— To draw the hour lines on an erect direct east or west plane.  
Hour lines in these dials must be parallel to one another,  
and the dial not have any centre, but drawn as follows :

An east direct dial in the latitude of 51 degrees 32 minutes.



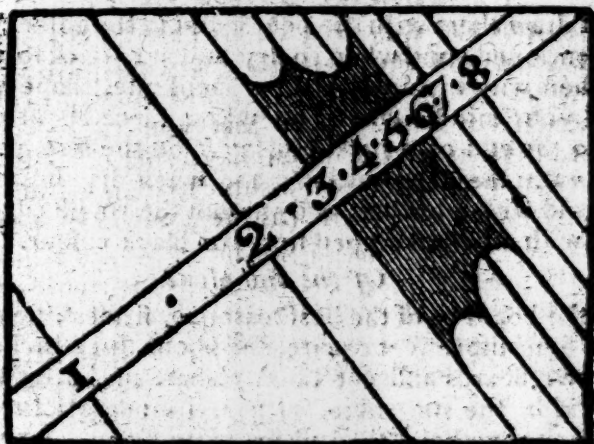
Let A B C D be the dial plane, on which is to be drawn in  
a direct east dial: upon the point D, if an east dial, and on  
the

the point C, if a west with the radius (or chord of 60 degrees) describe the obscure arc E F; then from your chords take 38 deg. 28 min. (the compliment of the latitude of the place) and set them from E to F, and draw the line D F quite through the plane; then, that you may proportion the stile to the plane, so that you may bring on all the hours from sun rising to 11 o'clock, assume two points in the line F D, one towards the end D, (as the point G) for the hour line of 11, and another at H for the hour line of 6; and through the points G and H, draw the lines 11 G 11, and 6 H 6 on the point G, with the chord of 60 degrees, describe the obscure arc I K; and taking 15 degrees from the scale of chords in the compasses, set one foot in I, and with the other cut the arc I K in K; through G and K draw the line G K L, cutting the line 6 H 6 in the point L; so shall L H be the height of the perpendicular stile proportioned to this plane.

For the drawing of the hour lines, set one foot of the compasses (opened to 60 deg. of the chords in L) and with the other describe the arc M N, between the hour line of 6 and the line G L, which divide into five equal parts in the points O O O O O, and a ruler laid from the point L, to each of these points O O O, &c. will cut the equinoctial line H D in the points \* \* \* \*, through which points draw lines parallel to 6 H 6, as the lines 7\*7, 8\*8, &c. as may be seen in the figure.

And thus you have made two dials, viz. a west dial as well as an east; only the arc E F, through which the equinoctial passeth in the east dial, is drawn on the right hand of the plane; but in the west it must be drawn on the left; and the hour lines 4, 5, 6, 7, 8, 9, 10, and 11 in the forenoon on the east dial must be 8, 7, 6, 5, 4, 3, 2, and 1 in the afternoon, upon the west dial, as in the following figure.



*An erect and direct west dial.*

The stile of the east or west dials may be either a straight pin of the just length of the line H O in the other figure, which is equal to H L fixt on the point H, on the hour-line of 6, and exactly perpendicular to the plane, shewing the hours by the shadow of the apex, or very near the top thereof; or it may be a plate of brass of the same breadth with the distance of the hour lines of 6 and 3; which plate must be set perpendicular upon the hour line of 6, and so it will shew the hour by the shadow on the upper edge thereof, as in the last figure.

*Of beautifying and colouring dials.*

FIRST, the boards are to be brushed over with lintseed oil, thinly ground with Spanish brown, done over three or four times (drying between each time) a little thicker each time with the colour; and this is called the Priming.

*To make the fat oil for colours.*

Boil red lead, and lintseed oil, and a little litharge of gold, (about a pennyworth) together, till almost as thick as syrup; and when cold and well settled, pour the clearest into a bottle or bladder for use.

*The gold size for dials.*

Mix fine ground yellow oaker with the aforesaid fat oil to such a consistency, as when used, it may settle smooth of itself.

*A mixture for hour lines.*

Grind vermilion or lamp black with the fat oil.

To

*To draw golden letters or figures for the hours.*

First draw them with the pencil dipt in the golden size before mentioned; and when so dry as just to stick to your fingers, then with a smooth edged penknife, shape your leaf gold to your mind; take it up with a piece of cotton cloth fixed to the end of a stick, and lay it on the size, pressing it down with the same cotton; and when dry brush off the loose gold with a feather, and smooth the rough edges of the letters with a pencil dipped in red or black colour.

*Of the dial plane.*

Let the board be of the best seasoned, firmest, clearest oak, one, two, or more feet square, and about three inches thick. Take two boards and get them plained on both sides, and then laid in the sun-shine, or near a moderate fire two or three days together; then plane them again, and fix them with good joints, and fasten them in gluing with wooden pegs, as I have seen coopers fix their pieces of heading for their casks; and when thus glued and dried, plane them again, and then fasten them by nailing two small plates of iron or tin on the back. If you cannot get seasoned wood, but green, then boil it about an hour in water to make it tough, and keep it from warping. In the general, wood is accounted better than stone, because it keeps the colouring more staunch or firm.

Before you colour your dial plate or board, fix your iron stile of 38 degrees, (which indifferently serves for all England) and having marked your hour lines with ink, and fastened a nail at the end of each hour line, that the head of each nail may shadow or direct you to the centre when it is coloured. And as it may happen that golden letters or figures may decay in a few years, you may on that account make them with white-lead paint, painted with red in a black margin.—When your dial is finished and dry, dip a feather in your oil, and anoint it thinly; for the finer you mix or grind the colouring with the oil, the more beautiful it appears, though not so lasting.

These hints of colouring dials, put me in mind of some other necessary touches relating to sundry mixtures of colours and drying of stuffs, &c. collected from Mr Salmon's Polygraphice.

*Of Colouring and dying.*

Whites, are ceruse, white flake and white lead.

Blacks, are lamp black, burnt cherry stones, and old ivory burnt.

Reds, are red lead, vermillion, red baker, and Indian lake.

Greens, are verdigrease, verditer, and sap green made of the juice of buckthorn berries.

Yellows, are saffron, yellow pink, gambogia.

Brown, is umber burnt.

Gold colour, is orpiment.

Again, Verdigrease with a little sap green, makes a good and a bright green.

Blues, are ultramarine, smalt, indigo, and blue bice.

*Of mixing colours.*

Colours are mixed by being ground on a stone with fair water severally, and dried and kept in paper bags for use: except lamp black, saffron, smalt, gambogia, and sap green.

Blue, to compound; temper a little indigo and smalt with oil.

A light blue, mix salt and white lead together.

Lead colour, mix lamp black and white lead together on a marble.

A fox colour is umber burnt.

Gold colour, is orpiment mixt with fat oil, by a knife on an earthen plate, or gally tile rather.

To hinder colours from cracking, put oil of walnuts to them.

Yellow colour, beat saffron to powder, and steep it in vinegar.—Or take the Yellow chieves in white lilies and gum water mixt for writing.

Red; vermillion with gum water mixed for writing.

Golden Letters, to write; mix vermillion and gum aramoniack with the yolk of eggs.

*Of dying wool stuffs, &c.*

To dye blue.—Take woad one pound, and mix it with four pints of boiling water, and steep whites in it 24 hours.

To dye red of a clear colour.—Take 60 pints of water wherein bran has been steeped 24 hours, and when strained dissolve two pounds of allum, and one pound of tartar; in which water boil what you have to dye for two hours: then take it out, and boil it in half as much fresh water made of

Cc

bran,

bran, viz. 30 pints; to which add madder 3 pounds, and so perfect the colour with moderate warmth, without boiling.

To dye green,—First make a yellow by the direction underneath; then take 60 pints of water wherein bran hath been soaked, aforesaid; then strain it, let 3 pounds of allum be dissolved in it, and then boil what you have to dye in it, for two hours.

To dye yellow,—Take woad two pounds, of the said water of bran, and boil till the colour is good.

And if you would have the said yellow to be green, put the stuff into the aforesaid blue lye.

To dye a sad colour,—Add logwood to the black dye before mentioned.

To dye linen or thread, &c. light red,—Take powder of brazil and vermillion, of each one ounce boiled in allum-water, &c.

To dye linen or thread, yellow,—Dissolve gambogia in allum water, &c.

To stain skins blue,—Boil elder berries, with the liquor brush over the skins, and wring them, then boil the berries in allum water, and wet them twice over,

### OF MONEY.

**T**HE current coin of this nation is made either of copper, silver, or gold: of copper is made the farthings and half pence; of silver, the pennies, two-pences, three-pences, groats, sixpences, shillings, half-crowns, and crowns. But there is very little silver coined below the sixpences. Of gold is made the quarter guinea, the half guinea, the guinea, and the 5 guinea piece; besides, there are foreign pieces of gold that pass though with some scruple; as the Portuguese moidore; at 27s. pieces of 36s. each: and others of 3l. 12s. There are also some few ancient pieces of gold of a pale colour, as being alloyed with silver, and therefore may be reckoned the best, and sometimes called angel, or crown gold: whereas the old gold or broad pieces are mostly alloyed with copper, which makes them of a reddish colour.

#### *Imaginary Money.*

We appropriate several names to money of which there is no coin; as,

|                          |   |   |   |   | s. | d. |
|--------------------------|---|---|---|---|----|----|
| The pound of             | — | — | — | — | 20 | 0  |
| The merk,                | — | — | — | — | 13 | 4  |
| The noble, or half merk, | — | — | — | — | 6  | 8  |
| The angel,               | — | — | — | — | 10 | 0  |
|                          |   |   |   |   |    | 10 |



In England, accompts are kept in pounds, shillings, and pence sterling: and their merks are derived from their names in Latin, viz *l.* for *librae*, or pounds, *s.* for *solidi*, or shillings, *d.* for *denarii*, or pence, *qr.* for *quadrantes*, or farthings, 4 making a penny: and expressed or set down thus:

*l. s. d. qr.*

4 16 8 3

But better thus,—*L. 4: 16: 8½*. The mark for pounds standing before the sum denominates the first number; and the others are known of course; for after pounds follow shillings, and after shillings succeed pence, &c. When the price of any thing is shillings and pence, it is set down thus: *4s. 6d.* or thus, *4: 6* when shillings and pence, and parts of a penny, expressed thus.

*s. d.*

4 6½

or thus, *4s. 6½d.* The latter way by some is accounted the neater, and the best method to express parts of a penny, or farthings; thus,

¼ a farthing, or one fourth part of what it follows.

½ a halfpenny, or one half of what it follows

¾ three farthings, or 3—4ths of what it follows.

And being thus set fraction wise, the under figures shew how many parts the quantity before it is divided into, and the upper figure shews how many of those under parts the fraction stands for; as thus, ⅔ of an ell, ¾ of a foot, or 9 inches, and the same of a shilling is 9 pence; and of a pound is 15s.

*yd.*

If you are to set down 6 yards and a half, write thus. 6½

Nineteen hundred three quarters, thus,

19C¾

Sixteen pounds and a quarter, thus,

16lb¼

or else thus, 19 C ¾, 16 lb. ¼, 5 feet ¾, 14 days ¾. Here the name is put between the whole number and the fraction, which I think is the plainer and better way: for example, 6½ hhds. through ignorance or wilfulness, may be read 6 half hhds. as well as 6 hhds. and a half: and at a certain place where I have had business, the wharfingers clerks expressed their half hhds in this manner.

Table of the value of Gold and silver.

Gold.

Silver.

1 pound is worth *L. 48 0 0*  
1 ounce 4 0 0  
1 pennyweight 0 4 0  
1 grain 0 0 3

1 pound is worth *L. 3 0 0*  
1 ounce 0 5 0  
1 pennyweight 0 0 3  
1 grain 0 0 1

A TABLE, exhibiting at one view the Value of any Number of Portugal Pieces of gold, in English pound and shillings.

## Portugal Pieces.

| Number<br>of<br>Pieces | At<br>L. 3 12. |    | At<br>L. 1 16 |    | At<br>L. 0 18. |    | At<br>L. 1 7 |    |
|------------------------|----------------|----|---------------|----|----------------|----|--------------|----|
|                        | l.             | s. | l.            | s. | l.             | s. | l.           | s. |
| 1                      | 3              | 12 | 1             | 16 | 0              | 18 | 1            | 7  |
| 2                      | 7              | 4  | 3             | 12 | 1              | 16 | 2            | 14 |
| 3                      | 10             | 16 | 5             | 8  | 2              | 14 | 4            | 1  |
| 4                      | 14             | 8  | 7             | 4  | 3              | 12 | 5            | 8  |
| 5                      | 18             | 0  | 9             | 0  | 4              | 10 | 6            | 15 |
| 6                      | 21             | 12 | 10            | 16 | 5              | 8  | 8            | 2  |
| 7                      | 25             | 4  | 12            | 12 | 6              | 6  | 9            | 9  |
| 8                      | 28             | 16 | 14            | 8  | 7              | 4  | 10           | 16 |
| 9                      | 32             | 8  | 16            | 4  | 8              | 2  | 12           | 3  |
| 10                     | 36             | 0  | 18            | 0  | 9              |    | 13           | 10 |
| 20                     | 72             |    | 36            |    | 18             |    | 27           |    |
| 30                     | 108            |    | 54            |    | 27             |    | 40           | 10 |
| 40                     | 144            |    | 72            |    | 36             |    | 54           |    |
| 50                     | 180            |    | 90            |    | 45             |    | 67           | 10 |
| 60                     | 216            |    | 108           |    | 54             |    | 81           |    |
| 70                     | 252            |    | 126           |    | 63             |    | 94           | 10 |
| 80                     | 288            |    | 144           |    | 72             |    | 108          |    |
| 90                     | 324            |    | 162           |    | 81             |    | 121          | 10 |
| 100                    | 360            |    | 180           |    | 90             |    | 135          |    |
| 200                    | 720            |    | 360           |    | 180            |    | 270          |    |
| 300                    | 1080           |    | 540           |    | 270            |    | 405          |    |
| 400                    | 1440           |    | 720           |    | 360            |    | 540          |    |
| 500                    | 1800           |    | 900           |    | 450            |    | 675          |    |
| 600                    | 2160           |    | 1080          |    | 540            |    | 810          |    |
| 700                    | 2520           |    | 1260          |    | 630            |    | 945          |    |
| 800                    | 2880           |    | 1440          |    | 720            |    | 1080         |    |
| 900                    | 3240           |    | 1620          |    | 810            |    | 1215         |    |
| 1000                   | 3600           |    | 1800          |    | 900            |    | 1350         |    |
| 5000                   | 18000          |    | 9000          |    | 4500           |    | 6750         |    |
| 10000                  | 36000          |    | 18000         |    | 9000           |    | 13500        |    |

A TABLE

A TABLE for buying or selling any commodity by the great hundred, which is 112 pounds.

| d. q. | l. | s. | d.  | d. q. | l. | s. | d.   | d. q. | l. | s. | d.   | d. q. | l. | s. | d.   |
|-------|----|----|-----|-------|----|----|------|-------|----|----|------|-------|----|----|------|
| 0     | 1  | 0  | 24  | 1     | 2  | 18 | 4    | 1     | 5  | 14 | 4    | 1     | 8  | 10 | 4    |
|       | 2  | 0  | 48  | 2     | 3  | 0  | 8    | 2     | 5  | 16 | 8    | 2     | 8  | 12 | 8    |
|       | 3  | 0  | 70  | 3     | 3  | 3  | 0    | 3     | 5  | 19 | 0    | 3     | 8  | 15 | 0    |
| 1     | 0  | 0  | 94  | 7     | 0  | 3  | 5 4  | 13    | 0  | 6  | 1 4  | 19    | 0  | 8  | 17 4 |
|       | 1  | 0  | 118 | 1     | 3  | 7  | 8    | 1     | 6  | 3  | 8    | 1     | 8  | 19 | 8    |
|       | 2  | 0  | 140 | 2     | 3  | 10 | 0    | 2     | 6  | 6  | 0    | 2     | 9  | 2  | 0    |
|       | 3  | 0  | 164 | 3     | 3  | 12 | 4    | 3     | 6  | 8  | 4    | 3     | 9  | 4  | 4    |
| 2     | 0  | 0  | 188 | 8     | 0  | 3  | 14 8 | 14    | 0  | 6  | 10 8 | 20    | 0  | 9  | 6 8  |
|       | 1  | 1  | 10  | 1     | 3  | 17 | 0    | 1     | 6  | 13 | 0    | 1     | 9  | 9  | 0    |
|       | 2  | 1  | 34  | 2     | 3  | 19 | 4    | 2     | 6  | 15 | 4    | 2     | 9  | 11 | 4    |
|       | 3  | 1  | 58  | 3     | 4  | 1  | 8    | 3     | 6  | 17 | 8    | 3     | 9  | 13 | 8    |
| 3     | 0  | 1  | 80  | 9     | 0  | 4  | 4 0  | 15    | 0  | 7  | 0 0  | 21    | 0  | 9  | 16 0 |
|       | 1  | 1  | 104 | 1     | 4  | 6  | 4    | 1     | 7  | 2  | 4    | 1     | 9  | 18 | 4    |
|       | 2  | 1  | 128 | 2     | 4  | 8  | 8    | 2     | 7  | 4  | 8    | 2     | 10 | 0  | 8    |
|       | 3  | 1  | 150 | 3     | 4  | 11 | 0    | 3     | 7  | 7  | 0    | 3     | 10 | 3  | 0    |
| 4     | 0  | 1  | 174 | 10    | 0  | 4  | 13 4 | 16    | 0  | 7  | 9 4  | 22    | 0  | 10 | 5 4  |
|       | 1  | 1  | 198 | 1     | 4  | 15 | 8    | 1     | 7  | 11 | 8    | 1     | 10 | 7  | 8    |
|       | 2  | 2  | 20  | 2     | 4  | 18 | 0    | 2     | 7  | 14 | 0    | 2     | 10 | 10 | 0    |
|       | 3  | 2  | 44  | 3     | 5  | 0  | 4    | 3     | 7  | 16 | 4    | 3     | 10 | 12 | 4    |
| 5     | 0  | 2  | 68  | 11    | 0  | 5  | 2 8  | 17    | 0  | 7  | 18 8 | 23    | 0  | 10 | 14 8 |
|       | 1  | 2  | 90  | 1     | 5  | 5  | 0    | 1     | 8  | 1  | 0    | 1     | 10 | 17 | 0    |
|       | 2  | 2  | 114 | 2     | 5  | 7  | 4    | 2     | 8  | 3  | 4    | 2     | 10 | 19 | 4    |
|       | 3  | 2  | 138 | 3     | 5  | 9  | 8    | 3     | 8  | 5  | 8    | 3     | 11 | 1  | 8    |
| 6     | 0  | 2  | 160 | 12    | 0  | 5  | 12 0 | 18    | 0  | 8  | 8 0  | 24    | 0  | 11 | 4 0  |

EXAMPLE.

First at 5d. 3q. the pound, what is the great hundred? Look in the table for 5d. 3q. in the first column and against in the second, you shall find 2l. 13s. 8d. and so much will 112 pounds cost. Again, if a hundred weight cost 4l. 8s. 8d. find 4l. 8s. 8d. and against it, in the column towards the left hand, you will find 9d. 2q. and so much it is by the pound.

Note. For every farthing that one pound doth cost reckon two shillings and fourpence, and that is the price of the great hundred.

| INTEREST at 3 per Cent. |              |    |   |  |              |    |    |   |             |    |   |  |
|-------------------------|--------------|----|---|--|--------------|----|----|---|-------------|----|---|--|
| Prin-<br>cipal.<br>L.   | For one Day. |    |   |  | Thirty days. |    |    |   | A Year.     |    |   |  |
|                         | l. s. d. f.  |    |   |  | l. s. d. f.  |    |    |   | l. s. d. f. |    |   |  |
| 1                       |              |    |   |  |              |    | 2  |   |             | 7  | 1 |  |
| 2                       |              |    |   |  |              | 1  |    |   | 1           | 2  | 1 |  |
| 3                       |              |    |   |  |              | 1  | 3  |   | 1           | 9  | 2 |  |
| 4                       |              |    |   |  |              | 6  | 1  |   | 2           | 4  | 3 |  |
| 5                       |              |    |   |  |              | 3  |    |   | 3           |    |   |  |
| 6                       |              |    |   |  |              | 3  | 2  |   | 3           | 7  | 1 |  |
| 7                       |              |    |   |  |              | 4  |    |   | 4           | 2  | 1 |  |
| 8                       |              |    |   |  |              | 4  | 3  |   | 4           | 9  | 3 |  |
| 9                       |              |    |   |  |              | 5  | 1  |   | 5           | 4  | 3 |  |
| 10                      |              |    |   |  |              |    | 5  | 3 |             | 6  |   |  |
| 20                      |              |    | 1 |  |              | 11 | 3  |   | 12          |    |   |  |
| 30                      |              |    | 2 |  | 1            | 5  | 3  |   | 18          |    |   |  |
| 40                      |              |    | 3 |  | 1            | 11 | 2  |   | 1           | 4  |   |  |
| 50                      |              | 1  |   |  | 2            | 5  | 2  |   | 1           | 10 |   |  |
| 60                      |              | 1  |   |  | 2            | 11 | 2  |   | 1           | 16 |   |  |
| 70                      |              | 1  |   |  | 3            | 5  | 1  |   | 2           | 2  |   |  |
| 80                      |              | 1  |   |  | 3            | 11 | 1  |   | 2           | 8  |   |  |
| 90                      |              | 1  |   |  | 4            | 5  | 1  |   | 2           | 14 |   |  |
| 100                     |              | 2  |   |  | 4            | 11 |    |   | 3           |    |   |  |
| 200                     |              | 3  | 3 |  | 9            | 10 | 1  |   | 6           |    |   |  |
| 300                     |              | 5  | 3 |  | 14           | 9  | 3  |   | 9           |    |   |  |
| 400                     |              | 7  | 3 |  | 19           | 8  | 3  |   | 12          |    |   |  |
| 500                     |              | 10 |   |  | 1            | 4  | 7  | 3 | 15          |    |   |  |
| 600                     |              | 11 | 3 |  | 1            | 9  | 7  |   | 18          |    |   |  |
| 700                     | 1            | 1  | 3 |  | 1            | 14 | 6  | 1 | 21          |    |   |  |
| 800                     | 1            | 3  | 3 |  | 1            | 19 | 5  | 1 | 24          |    |   |  |
| 900                     | 1            | 5  | 3 |  | 2            | 9  | 4  | 2 | 27          |    |   |  |
| 1000                    | 1            | 7  | 3 |  | 2            | 4  | 3  | 3 | 30          |    |   |  |
| 2000                    | 3            | 3  | 2 |  | 4            | 18 | 7  | 2 | 60          |    |   |  |
| 3000                    | 4            | 11 |   |  | 7            | 7  | 11 | 1 | 90          |    |   |  |
| 4000                    | 6            | 6  | 3 |  | 9            | 17 | 3  |   | 120         |    |   |  |
| 5000                    | 8            | 2  | 2 |  | 12           | 7  | 6  |   | 150         |    |   |  |



|        |      | INTEREST at 4 per Cent. |    |    |   |              |    |    |    |             |    |   |  |
|--------|------|-------------------------|----|----|---|--------------|----|----|----|-------------|----|---|--|
|        |      | For 1 day.              |    |    |   | Thirty days. |    |    |    | A Year.     |    |   |  |
| Prin-  |      | l. s. d. f.             |    |    |   | l. s. d. f.  |    |    |    | l. s. d. f. |    |   |  |
| cipal. | L.   |                         |    |    |   |              |    |    |    |             |    |   |  |
|        | 1    |                         |    |    |   |              |    |    | 3  |             |    |   |  |
|        | 2    |                         |    |    |   |              |    |    |    | 9           |    | 2 |  |
|        | 3    |                         |    |    |   |              | 1  | 2  |    | 1           | 7  | 1 |  |
|        | 4    |                         |    |    |   |              | 2  | 1  |    | 2           | 4  | 3 |  |
|        | 5    |                         |    |    |   |              | 3  | 1  |    | 3           | 2  | 2 |  |
|        | 6    |                         |    |    |   |              | 4  | 0  |    | 4           |    |   |  |
|        | 7    |                         |    |    |   |              | 4  | 3  |    | 4           | 9  | 2 |  |
|        | 8    |                         |    |    |   |              | 5  | 2  |    | 5           | 7  | 1 |  |
|        | 9    |                         |    |    |   |              | 6  | 1  |    | 6           | 4  | 3 |  |
|        |      |                         |    |    |   |              | 7  |    |    | 7           | 2  | 2 |  |
|        | 10   |                         |    | 1  |   |              | 7  | 3  |    | 8           |    |   |  |
|        | 20   |                         |    | 2  |   |              | 1  | 3  | 3  | 16          |    |   |  |
|        | 30   |                         |    | 3  |   |              | 1  | 11 | 2  | 1           | 4  |   |  |
|        | 40   |                         | 1  |    |   |              | 2  | 7  | 2  | 1           | 12 |   |  |
|        | 50   |                         | 1  | 1  |   |              | 2  | 3  | 1  | 2           |    |   |  |
|        | 60   |                         | 1  | 2  |   |              | 3  | 11 | 1  | 2           | 8  |   |  |
|        | 70   |                         | 1  | 3  |   |              | 4  | 6  | 3  | 2           | 16 |   |  |
|        | 80   |                         | 2  |    |   |              | 5  | 3  |    | 3           | 4  |   |  |
|        | 90   |                         | 2  | 1  |   |              | 5  | 11 |    | 3           | 12 |   |  |
|        | 100  |                         | 2  | 2  |   |              | 6  | 6  | 3  | 4           |    |   |  |
|        | 200  |                         | 5  | 1  |   |              | 13 | 1  | 3  | 8           |    |   |  |
|        | 300  |                         | 7  | 3  |   |              | 19 | 8  | 3  | 12          |    |   |  |
|        | 400  |                         | 10 | 2  |   |              | 1  | 6  | 3  | 16          |    |   |  |
|        | 500  |                         | 1  | 1  | 0 |              | 1  | 12 | 10 | 20          |    |   |  |
|        | 600  |                         | 1  | 3  | 3 |              | 1  | 19 | 5  | 24          |    |   |  |
|        | 700  |                         | 1  | 6  | 2 |              | 2  | 6  | 0  | 28          |    |   |  |
|        | 800  |                         | 1  | 9  | 0 |              | 2  | 12 | 7  | 32          |    |   |  |
|        | 900  |                         | 1  | 11 | 2 |              | 2  | 19 | 2  | 36          |    |   |  |
|        | 1000 |                         | 2  | 2  | 1 |              | 3  | 5  | 9  | 40          |    |   |  |
|        | 2000 |                         | 4  | 4  | 2 |              | 6  | 11 | 6  | 80          |    |   |  |
|        | 3000 |                         | 6  | 6  | 3 |              | 9  | 17 | 3  | 120         |    |   |  |
|        | 4000 |                         | 8  | 9  | 0 |              | 13 | 3  |    | 160         |    |   |  |
|        | 5000 |                         | 10 | 11 | 2 |              | 16 | 8  | 9  | 200         |    |   |  |

## INTEREST at 5 per Cent.

| Principal. | For 1 Day. |    |    |          | Thirty Days. |    |    |            | A Year |    |    |      |
|------------|------------|----|----|----------|--------------|----|----|------------|--------|----|----|------|
|            | l.         | s. | d. | f.       | l.           | s. | d. | f.         | l.     | s. | d. | f.   |
| 1          |            |    |    |          |              |    |    | 1          |        |    |    | 1    |
| 2          |            |    |    |          |              |    |    | 2          |        |    |    | 2    |
| 3          |            |    |    |          |              |    |    | 3          |        |    |    | 3    |
| 4          |            |    |    |          |              |    |    | 3 3        |        |    |    | 4    |
| 5          |            |    |    |          |              |    |    | 4 3        |        |    |    | 5    |
| 6          |            |    |    |          |              |    |    | 5 3        |        |    |    | 6    |
| 7          |            |    |    |          |              |    |    | 6 3        |        |    |    | 7    |
| 8          |            |    |    |          |              |    |    | 7 3        |        |    |    | 8    |
| 9          |            |    |    | 1        |              |    |    | 8 3        |        |    |    | 9    |
|            |            |    |    | 1        |              |    |    |            |        |    |    |      |
| 10         |            |    |    | 1        |              |    |    | 9 3        |        |    |    | 10   |
| 20         |            |    |    | 3        |              |    |    | 1 7 3      |        |    |    | 1 10 |
| 30         |            |    |    | 1        |              |    |    | 2 5 2      |        |    |    | 1 10 |
| 40         |            |    |    | 1 1      |              |    |    | 3 3 2      |        |    |    | 2 10 |
| 50         |            |    |    | 1 1      |              |    |    | 4 1 1      |        |    |    | 2 10 |
| 60         |            |    |    | 1 2      |              |    |    | 4 11       |        |    |    | 3 10 |
| 70         |            |    |    | 2        |              |    |    | 5 9        |        |    |    | 3 10 |
| 80         |            |    |    | 2 1      |              |    |    | 6 6 3      |        |    |    | 4 10 |
| 90         |            |    |    | 2 2      |              |    |    | 8 4 3      |        |    |    | 4 10 |
|            |            |    |    | 3        |              |    |    |            |        |    |    |      |
| 100        |            |    |    | 3 1      |              |    |    | 8 2 2      |        |    |    | 5    |
| 200        |            |    |    | 6 2      |              |    |    | 16 5 1     |        |    |    | 10   |
| 300        |            |    |    | 9 3      |              |    |    | 1 4 7 3    |        |    |    | 15   |
| 400        |            |    |    | 1 1      |              |    |    | 1 12 10 2  |        |    |    | 20   |
| 500        |            |    |    | 1 4 1    |              |    |    | 2 1 1      |        |    |    | 25   |
| 600        |            |    |    | 1 7 3    |              |    |    | 2 9 3 3    |        |    |    | 30   |
| 700        |            |    |    | 1 11     |              |    |    | 2 17 6 1   |        |    |    | 35   |
| 800        |            |    |    | 2 1 1    |              |    |    | 3 5 9      |        |    |    | 40   |
| 900        |            |    |    | 2 5 1    |              |    |    | 3 13 11 2  |        |    |    | 45   |
| 1000       |            |    |    | 2 8 3    |              |    |    | 4 2 2      |        |    |    | 50   |
| 2000       |            |    |    | 5 5 3    |              |    |    | 8 4 4 2    |        |    |    | 100  |
| 3000       |            |    |    | 8 2 2    |              |    |    | 12 6 6 3   |        |    |    | 150  |
| 4000       |            |    |    | 1 0 11 2 |              |    |    | 16 8 9 1   |        |    |    | 200  |
| 5000       |            |    |    | 1 3 8 1  |              |    |    | 20 10 11 2 |        |    |    | 250  |

*Hint of Generals, or Things proper to be known or remembered on particular occasions.*

- A ream of paper, 20 quires.  
A quire of paper 24 sheets.  
A bale of paper, 10 reams.  
A roll of parchment, 5 dozen, or 60 skins.  
A dicker of hides, 10 skins.  
Ditto of gloves, 10 dozen pair.  
A last of hides, 20 dickers.  
A load of timber unhewed, 40 feet.  
A chaldron of coals, 36 bushels.  
A hogshead of wine, 63 gallons.  
Ditto of beer, 54 gillons.  
A barrel of beer, 36 gallons.  
Ditto of ale, 32 gallons.  
A gross, 144 or 12 dozen.  
A wey of cheese, 256 pounds.  
Days in a year 365, weeks 52, and hours 8766.  
Pence in a pound 240, farthings 960.  
An acre of land, 160 square poles, or perches.  
A last of corn or rape seed, 10 quarters.  
A quarter in England 8 bushels: in Scotland 4 bolls.  
Ditto of pot ashes, cod fish, white herrings, meal, pitch, and tar, 12 barrels.  
Ditto of flax and feathers, 17 Cwt. of gun-powder, 24 barrels, or 2400 lb. of wool, 4368 lb.  
A tun of wine, 252 gallons: oil of Greenland, 252 gallons, and sweet oil of Genoa, 236 gallons.  
A ton in weight, 20 Cwt. of iron, &c. but of lead there is but 19 Cwt. and a half, called a fodder or fother.  
A tod of wool, 28 pounds.  
A pack of ditto, 364 pounds.  
A load of bricks, 500: and of plain tiles, 1000.  
A stone of fish, 18 lb. and of wool, 14 lb. The same for horseman's weight, and also hay; but pepper, cinnamon, and allum, have but 13½ lb. to the stone.  
Ditto of glass, 5 lb. and a seam of ditto, 24 stone.  
A truss of hay, 56 lb; and a load of ditto, 39 trusses.  
Note, New hay in June and August, ought to be 60 lb. the truss, as per statute of 3d William and Mary. 1693.  
A cade of red herrings, 500: and of sprats, 1000.  
Iron and shot, 14 lb. to the stone.

*Barrels of sundry commodities.*

Anchovies, 30 lb.  
 A double barrel, 60 lb.  
 Nuts or apples, 3 bushels.  
 Pot ash or Barilla, 200 lb.  
 White or black plates, 300  
 Candles, 10 doz lb.  
 Salmon or eels, 42 gal.  
 Figs, 3 qrs. 14 lb. to 2 C<sup>t</sup>

Raisins, 1 Cwt.  
 Oil, 31 gallons and a half.  
 Spanish tobacco, 2 Cwt, to 3  
 Cwt.  
 Gunpowder, 1 Cwt.  
 Soap, 240 lb.  
 Butter, 224 lb.  
 Herrings, 32 gallons.

*Things in wholesale trade bought and sold by the thou and.*

Cuttle bones.  
 Oranges and lemons.  
 Chair nails.  
 Tacks and tenter-hooks.  
 Pomegranates and tazeis.  
 Goose quills and thimbles.

Bricks.  
 Clinkers or Flanders tiles.  
 Billets and leaves of horn.  
 Barrel hoops.  
 Squirrel skins.  
 Slate and hilling stones.

*Pins and small needles by the 1200 dozens.*

*Things bought and sold at score to the hundred.*

Banks and barlings.  
 Barrels and pipe boards.  
 Bomp spars and bow staves  
 Consars and caprevans.  
 Herrings and deal boards  
 Nails, eggs, and cod fish.

cole, ling, and Newfound-  
 land fish, stock fish of all  
 sorts,  
 Ells of canvass, and most fo-  
 reign lincens.  
 Hogshhead staves.

## **Of bonds, Bills Letters of Attorney, Wills, and other useful writings.**

Precedents of these are very necessary, not only for the understanding of them, but to know how to make them properly on occasion.

*A Bond from one to one.*

**K**now all men by these presents, That I Abraham Dar-  
 nell, of the parish of St Sepulchre's in the city of Lon-  
 don, Gentleman, am held and firmly bound to John Melver  
 of the said city of London, Esq.; in the sum of fifty pounds of  
 good and lawful money of Great Britain, to be paid to the  
 said John Melver, or to his certain attorney, his executors,  
 administrators, or assigns; for the true payment where of I bind  
 myself



myself, my heirs, executors, and administrators, firmly by these presents, sealed with my seal. Dated this twenty-first day of January, in the twentieth year of the reign of our sovereign Lord George the Third, by the grace of God, of Great Britain, France, and Ireland, King, defender of the faith, and so forth, and in the year of our Lord One thousand seven hundred and eighty.

The condition of this obligation is such, That if the above bounden Abraham Darnell, his heirs, executors or administrators do well and truly pay, or cause to be paid, to the above named John Mever, his executors, or administrators, or assigns, the full sum of twenty five pounds of good and lawful money of Great Britain, on the twentieth day of August next ensuing the date hereof, with lawful interest thereof; then this obligation to be void, or else to remain, continue, and be in full force and virtue.

Sealed and delivered (being first }  
duly stamped) in presence of } Abraham Darnel, O.  
Gregoty Needy.  
Thomas Trusty.

Note, The mark O, in this and the forms subsequent, represents the seal, which in this and all those in which it appears, ought to be fixed; the person who executes any of them (a Will accepted, concerning which directions will be given in its place) is, in the presence of the witnesses, to take off the seal (that is the instrument with which the impression was made) and taking the paper or parchment in his or her right hand, is to pronounce these words, I deliver this my act and deed for the purposes within mentioned.

*A bill with a penalty.*

**K**NOW all men by these presents, That I John Jenkins of the city of Chichester, in the county of Sussex, vicuallier, do acknowledge myself indebted to Martin Moneyman of East Grinstead, in the county aforesaid, grasier, in the sum of twenty pounds, of good and lawful money of Great Britain, to be paid unto the said Martin Moneyman his heirs executors, administrators, or assigns, in or upon the 29th day of September next ensuing the date hereof, without fraud or further delay; for and in the consideration of which payment, well and truly to be made and done, I bind myself, my heirs, executors, and administrators, or assigns, in the penal sum of forty pounds, of the like lawful money, firmly by these presents. In witness whereof, I have hereunto set my hand and seal, this twenty fifth day of March, in the twenty-seventh year

year of the reign of our Sovereign King George the Third, and in the year of our Lord God 1787.

Signed, sealed, and delivered in presence of

}

John Jenkins, O.

Titus Testimony.

Andrew Affidavit.

*A short Bill or Note of one's hand.*

**K** NOW all men by these presents, That I Peter Pennyless, of the parish of St Saviour's Southwark, in the county of Surry, black smith, do owe, and own myself to stand indebted to Robert Rich, of the parish of St Andrew, Holborn, in the county of Middlesex, Gent. in the just and duesum of Five pounds, of lawful money of Great Britain, which by these presents I promise to pay unto him the said Robert Rich, at or upon the 6th day of October next ensuing the date hereof; for the true performance of which payment well and truly to be made, and in witness hereof, I have set my hand to these presents, this fifth day of May 1787.

Peter Pennyless.

Among men of business, the following form is commonly used, and is equally effectual in law.

**I** PROMISE to pay To Mr Robert Rich, or his order, the sum of Five pounds, five months after date, for value received, this fifth day of May 1787. by Peter Pennyless.

This note is transferable to another, if Robert Rich write his name on the back thereof; but then, If Peter Pennyless doth not pay it Robert Rich is liable thereto.

*A penal Bill from two to one.*

**K** NOW all men by these presents, That we Laurence Luckless and Peter Pauper, both of the parish of St Dunstan, Stepney, in the county of Middlesex, weavers, do acknowledge and own ourselves to stand indebted to Gabriel Greedy, of the parish of St Olave, Southwark, in the county of Surry, felt maker, in the just and due sum of Ten pounds, of good and lawful money of Great Britain, to be paid unto him the said Gabriel Greedy, his heirs, executors, administrators or assigns, at or upon the thirteenth day of October next ensuing the date hereof, without fraud or further delay; for and in consideration of which payment, well and truly to be made we do bind our heirs executors, and administrators, in the penal sum of twenty pounds of the like lawful money firmly by these presents. In witness whereof, we have here

unto

unto set our hands and seals, this sixteenth day of February, in the twentieth year of the reign of our sovereign Lord King George the Third, &c. and in the year of our Lord One thousand seven hundred and eighty.

Signed, sealed, and delivered in the presence of

Law. Luckless, O.  
Peter Pauper, O.

Wimbleton Witness.

Timothy Testis.

Note, that bills without penalty are of no more force or lasting than book debts, as they are not sealed; yet they are esteemed better security, because the party's hand, if he contends, may be proved against him, but oft times on an adjustment of accounts, it is useful to have the party's hand to the book which is as valid as the other; but in my opinion, there ought to be a witness to either of them.

Note also, All obligations ought to be in English, and the words at length; they may be suited to any condition by only altering the name or names, place or places of abode, title or titles, sum or sums of money, date, &c.

Every bond, letter of attorney, indenture, and other thing to which a seal is affixed, wills excepted, must, to render it effectual, be stamped with a four shilling stamp.

Thus you may proceed of yourself, and save the charge of going too far distant to a scrivener, or an attorney, there being no other charge necessary but the stamped paper and your own trouble of writing.

*A Letter of Attorney.*

**K**NOW all men by these presents, That I Charles Careful of Lewes, in the county of Sussex, apothecary, (for divers considerations and good causes me hereunto moving,) having made, ordained, constituted and appointed, and by these presents do make, ordain, constitute, and appoint, my trusty friend William Wagstaff, of Pempsey, in the county aforesaid, Gentleman, my true and lawful attorney, for me, in my name, and to my use, to ask, demand, recover, or receive, of and from A. B. of Rye, in the said county, the sum of forty pounds; giving and by these presents granting to my said attorney, my sole and full power and authority to take, pursue, and follow such legal courses, for the recovering, receiving, and obtaining of the same, as I myself might or could do, were I personally present; and upon the receipt of the same, acquittances and other sufficient discharges, for me, and in my name, to make, sign, seal, and deliver; as also, one or more attorney or attorneys under him to substitute or appoint

D d

and

and again at his pleasure, to revoke; and further to do, perform, or execute for me, and in my name, all and singular thing or things which shall or may be necessary, touching and concerning the premises, are fully, thoroughly, and entirely, as I the said Charles Careful, in my own person, ought or could do in and about the same; ratifying, allowing and confirming whatsoever my said attorney shall lawfully do, or cause to be done, in and about the execution of the premisses, by virtue of these presents. In witness whereof, I have hereunto set my hand and seal, the sixth day of May, in the twentieth year of the reign of our sovereign Lord George the Third by the Grace of God King of Great Britain, &c. and in the year of our Lord One thousand seven hundred and eighty.

*. A letter of Attorney by a seaman.*

**K**NOW all men by these presents, that I Timothy Tarpaulin, mariner, now belonging to his majesty's ship the Rye, for divers good causes and considerations me thereunto moving, have, and by these presents do make my trusty friend Henry Hearty, citizen and baker of London, (or my beloved wife Penelope Tarpaulin), my true and lawful attorney, for me, and in my name, and for my use, to ask, demand, and receive, of and from the Right Honourable the treasurer and paymaster to his Majesty's navy, and the Commissioners of prize money, and whom else it may concern, as well as such wages and pay, bounty money, prize money, and all other sum or sums of money whatsoever, as now are, and which hereafter shall or may be due, or payable unto me; also all such pensions, salaries, smart money, or all other money and things whatsoever, which now are, or at any time hereafter, shall or may be due to me, for my service, or otherwise, in any one of his majesty's ship or ships, frigates or vessels: giving and hereby granting unto the said attorney, full and whole power to, take, pursue, and follow such legal ways and courses, for the recovery, receiving, and obtaining, and discharging upon the said sum or sums of money, or any of them, as I myself might or could do, were I personally present: and I do hereby ratify, allow, and confirm all and whatever my attorney shall lawfully do, or cause to be done, in and about the execution of the premisses, by virtue of these presents. In witness whereof, I have hereunto set my hand and seal, this seventeenth day of December One thousand seven hundred and eighty seven.

Timothy Tarpaulin, O.

*A short*



**I**N the name of God, Amen. I William Weakly, of the city of London, haberdasher, being very sick and weak in (or, in perfect health) of body, but (or, and) of perfect mind and memory, thanks be given unto God; calling unto mind the mortality of my body, and knowing that it is appointed for all men once to die, do make and ordain this my last will and testament; that is to say principally and first of all, I give and recommend my soul into the hand of Almighty God that gave it, and my body I recommend to the earth, to be buried in a decent Christian burial at the discretion of my executors, nothing doubting but at the general resurrection I shall receive the same again, by the mighty power of God. And as touching such worldly estate wherewith it has pleased God to bless me in this life, I give, demise, and dispose of the same, in the following manner and form.

First, I given and bequeath to Elizabeth, my dearly beloved wife, the sum of five hundred pounds of lawful money of England, to be raised and levied out of my estate, together with all my household goods, debts, and moveable effects.

Also, I give to my well beloved daughter Elizabeth Weakly, whom likewise constitute, make and ordain the sole executrix of this my last will and testament, all and singular my lands, messuages, and tenements, by her freely to be possessed and enjoyed. And I do hereby utterly disallow, revoke, and disannul all and every other former testaments, wills, legacies, bequests, and executors, by me in any wise before named, willed and bequeathed; ratifying and confirming this, and no other, to be my last will and testament. In witness whereof, I have hereunto set my hand and seal, this twelfth day of April, in the year of our Lord One thousand seven hundred and eighty eight.

Signed, sealed, published, pronounced, and declared by the said William Weakly, as his last will and testament; in his presence, and in the presence of each other, have hereto subscribed our names.

Henry Hardy.

Samuel Short.

William Wortle.

William Weakly, O.

The testator, after taking off the seal, must in the presence of the witnesses, pronounce these words, I publish and declare this to be my last will and testament.

Note, If a will be already made, and the person hath no mind to alter it, but to add something more, there may be affixed.

affixed the following codicil or schedule to it; and it will stand good in law as part of the will.

*A Codicil to a will.*

Be it known to all men by these presents, That I William Weakly, of the city of London, Haberdasher, have made and declared my last will and testament in writing bearing date the 12th day of April, One thousand seven hundred and eighty seven. I the said William Weakly, by this present Codicil, do ratify and confirm my said last will and testament; and do further give and bequeath unto my loving cousin and godson William Weakly, junior, the sum of fifty pounds, of good and lawful money of England, to be paid unto him the said William Weakly, by my Executrix, out of my estate: and my will and meaning is, that this Codicil be adjudged to be a part and parcel of my last will and testament; and that all things therein mentioned and contained be faithfully and truly performed, and as fully and amply in every respect, as if the same were so declared and set down in my said last will and testament. Witness my hand this twentieth day of April, One thousand seven hundred and eighty-seven.

Signed in presence of us,

William Warlton.

George Cox.

William Weakly O.

*A Deed of Gift.*

**T**O all people whom these presents shall come. I George Generous do send greeting: Know ye, That I the said George Generous, of the parish of Pancras, in the county of Middlesex, brickmaker, for and in consideration of the love, good-will, and affection, which I have and do bear towards my loving sister, Sarah Sorrowful, of the same parish and county, widow, have given and granted, and by these presents do freely give and grant, unto the said Sarah Sorrowful, her heirs, executors or administrators, all and singular my goods and chattels, now being in my present dwelling-house in the parish aforesaid, known by the name of Fisher's Figgary, of which (before the signing of these presents) I have delivered her, the said Sarah Sorrowful an inventory signed with my own hand, and bearing even date, to have and to hold all the said goods and chattels in the said premisses or dwelling house, to her the said Sarah Sorrowful, her heirs, executors, or administrators, from henceforth, as her and their proper goods and chattels absolutely without any manner of condition. In witness whereof, I have here-

unto

unto put my hand and seal, the fifth day of October, One thousand seven hundred and eighty seven.

Signed, sealed, and delivered in the presence of

George Generous O:

John Makins.

John Aukland.

Note, This precedent may be extended to the giving away of cattle, corn, house, or land, if not entailed, &c. but the particulars must be named, &c.

*An Indenture of Apprenticeship.*

**T**HIS indenture witnesseth, That Richard Raymond, son of Robert Raymond late of Romley, in the county of Sussex, hath put himself and by these presents doth voluntarily put himself, apprentice to Samuel Carpenter, citizen and linen diaper of London, to learn his art, trade or mystery, and after the manner of an apprentice to serve him from the day of the date hereof, for and during the full term of seven years next ensuing: during all which time, he the said apprentice his said master shall faithfully serve, his secrets keep, his lawful commands every where gladly obey. He shall do no damage to his said master, nor see it to be done by others without letting or giving notice thereof to his said master. He shall not waste his said master's goods, nor lend them unlawfully to others. He shall not commit fornication, nor contract matrimony, within the said term. At cards, dice, nor any unlawful game, he shall not play whereby his said master may be damaged. With his own goods or the goods of others, during the said term, without licence of his said master, he shall neither buy nor sell. He shall not absent himself day or night from his said master's service without his leave. Nor haunt alehouses, taverns, or playhouses: But in all things behave himself as a faithful apprentice ought to do during the said term: And the said master shall use the utmost of his endeavours to teach, or cause to be taught or instructed, the said apprentice, in the trade and mystery he now professeth, occupieth, or followeth; and procure and provide for him the said apprentice, sufficient meat, drink, apparel, washing and lodging, fitting for an apprentice during the said term. And for the true performance of all and every the said covenants and agreements, either of the said parties bind themselves unto the other by these presents. In witness whereof they have interchangeably put their hands and seals, this 16th day of April, in the 27th year of the reign of our sovereign Lord George III. by the grace of God, king of

Great Britain, &c. and in the year of our Lord God One thousand seven hundred and eighty seven.

Note, If an apprentice be enrolled before a justice of the peace, or other proper officer, (the chamberlain being such, in London) he cannot sue out his indenture, but upon proof of unmerciful usage, want of victuals, or other necessities, or his master being incapable of teaching him his trade, or not causing it so to be done at his proper charge by others. And the same holds good in relation to a mistress. But there being no enrolment an indenture may be sued out, without shewing cause, in cities and corporations, &c.

*A general Release.*

**K** NOW all men by these presents. That I Peter Peaceable, of Hastings in the county of Sussex tobaccoconist, have remitted, released, and for ever quit claim to William Winter of Rye in the county aforesaid, fish-chapman, his heirs, executors, and administrators, of all and all manner of action and actions, suits, bills, bonds, writings, debts, dues, duties, accompts, sum and sums of money, leases, mortgages, judgments by confession, or otherwise obtained, executions, extents, quarrels, controversies trespasses, damages, and demands whatsoever, which by law or equity, or otherwise soever, I the said Peter Peaceable, against the said William Winter; ever had, and which I, my heirs, executors, or administrators, shall or may claim, challenge or demand, for or by reason, or means, colour of any matter, cause or thing whatsoever, to the day of the date of these presents. In witness whereof I have hereunto set my hand and seal this 15th day of April, &c.

Peter Peaceable, O.

*The Complete Gardener: or, the Practice of Gardening in all its Branches, for the twelve months of the Year.*

JANUARY.

*Pleasure garden.*

**F**ROST is to be expected now, and nothing is so dangerous to tender flower roots, and their shoots for spring. Ranunculuses, anemonies, and tulips will be in danger, cover the beds to guard them, lay on pease straw where they are not come up: but where the shoots appear, place hoops with  
mats



mats and cloths upon them : This is the common practice, but in that excellent work, *The Complete body of gardening*, lately published, there is a new method proposed, and much easier and better. This is to place behind them a reed hedge, sloping three feet forward. A mat is to be let down from the top in severe weather, and taken up in mild. This certainly preserves them, and yet does not draw them weak, or make them tender.

Cover the beds and boxes of seedling flowers ; and take off the defence when the weather is milder.

Clean the Auricula-plants, pick off dead leaves, and scrape away the surface of the mould ; put fresh mould in the place of it, and set the pots up to the brim in the mould in a dry bed, and place behind them a reed hedge.

Cover Carnation-plants from wet, and defend from mice and sparrows.

*Kitchen garden.*

Throw up some new dung in a heap to heat, that it may be ready to make hot-beds both for the early cucumbers and melons in this part of the ground, and for raising seeds of annuals in the flower-garden.

Dig up the ground that is to be sown with spring crops, that it may lie and mellow.

Nurse the cauliflower plants kept under glasses carefully : shut out the frost, but in the middle of milder days let in a little air ; pick up the dead leaves, and gather up the mould about the stocks.

Make a slight hot-bed in the open ground for young sallading, and place hoops over it, that it may be covered in very hard weather.

Plant out endive for seed into warm borders ; earth and blanch cellery.

Sow a few beans and pease, and seek and destroy snails and other vermin.

*Orchard and fruit garden.*

Fruit trees, whether in orchards, or espaliers, or against walls, demand the same general management.

Cut out dead wood and irregular branches, clean the stumps and boughs from moss with a hollow iron, and repair espaliers, fastening the stakes and poles with nails and wire tying the shoots down with twigs of osier.

Place stakes by all new planted trees : and cut grafts to be ready, lay them in the earth under a warm wall.

## FEBRUARY.

*Pleasure garden.*

Make hot-beds for annual flowers with the dung laid up for that purpose, and sow them upon a good thickness of mould, laid regularly over the dung.

Transplant perennial flowers and hardy shrubs, Canterbury bells, lilies, and the like. Break up and new lay the gravel walks. Weed, rake, and clean the borders, and where the box of the edging is decayed, make it up with a fresh plantation.

Sow auricula and polyanthus seeds in boxes; these should be made of rough boards six inches deep, with holes at the bottom for the running off of water; they must be filled with light mould, and the seed scattered thinly over the surface, then some more mould must be sifted over them a quarter of an inch thick, and they must be set where they can enjoy the morning sun.

Plant out carnations into pots for flowering.

*Kitchen garden.*

Dig and level beds for sowing radishes and onions, carrots, and parsnips; and Dutch lettuce, leeks, and spinage, should also be sown now; Also beets, salsaly, sorrel, and marygolds with any other of the hardy kinds.

Make up the hot-beds for early cucumbers, and sow cauliflower seeds and some others.

Plant beans and sow pease: the best way in these useful things is to sow a new crop every fortnight, that if one succeeds and another fails, as will often be the case, there may still be a constant supply at the due season for the table. Plant kidney-beans upon a hot-bed for an early crop. The dwarf white, and Battersea beans are the best sorts. They must have air, in the middle of mild days when they are up, and once in two days they must be gently watered.

Transplant cabbages, plant out Silesia and cos lettuce from the beds where they grow in winter; and plant potatoes and Jerusalem artichokes.

*Orchard and fruit garden.*

Most kinds of trees may now be pruned, though it be better to do it to the generality in autumn; whatever has been omitted at that season in this article must be done now, the hardiest kinds being pruned first, and such as are more tender

der at the latter end of the month, when there will be little danger of their suffering from the frosts in the wounded parts.

Transplant fruit trees to places where they are wanted ; opening a large hole, setting the earth carefully about their roots, and nailing them at once to the wall, or fastening them up to strong stakes. Nail up the tenderer trees with care, and uncover the fig trees by degrees, which have been protected from frosts by mats. Sow the kernel of apples and pears, and the stones of plumbs, for stocks, and keep off birds that eat buds of fruit trees.

### MARCH.

#### *Pleasure garden,*

Watch the beds of tender flowers, and throw mats over them supported by hoops in hard weather.

Continue transplanting all the hardy perennial fibrous rooted flowers, sweet-williams, golden rods, and the like.

Dig up the earth with a shovel about those which were planted in autumn, and clean the ground between them.

All the pots of flowering plants must now be dressed, pick off dead leaves, remove the earth at the top, and put fresh in the place, then give them a gentle watering, and set them in their places for flowering ; in doing this take care the roots are not wounded, and repeat the watering once in three days.

The third week in March is the time to sow sweet-pease, poppies, catchflies, and all the hardy annual plants.

The last week is proper for transplanting evergreens : and for this purpose a showery day should be chosen. New hot-beds must be made to receive the seedlings of annual flowers raised in the former.

#### *Kitchen garden.*

Sow in the beds of the kitchen garden some carrots, and also the large peas rouncevals and grea.

In better ground sow cabbages and savoy, also carrots and parsnips for a second crop, and towards the end of the month put in a large parcel of beans and pease.

Sow parsley and plant mint.

Sow cos and imperial lettuce ; and transplant the finer kinds.

In the beginning of the month sow Dutch parsley for the roots.

The last week take the advantage of time, or, the dry days, and make asparagus beds.

Clear

Clear up the artichoke roots; slip of the weakest, and plant them out for a new crop, leaving four from each good root to bear; and from such as are weaker two.

Dig up a warm border, and sow some French beans, Let them have a dry soil, and give them no water till they appear.

#### *Orchard and fruit garden.*

The grafts which were cut off early and laid in the ground to be ready for use, are now to be brought into service, those of the earliest kinds are to be used first, and the apple last of all.

This done, let the gardener look to the stocks that were inoculated the last year, and take off their heads. A hand's breath should be left on above the place: This holds the bud secure by tying to it, and the sap rises more freely for its nourishment.

The fruit trees that were planted last October must be headed; and they should be cut down to almost four eyes. Some leave only three, but four is much better, the sap rises more freely.

#### APRIL.

##### *Pleasure garden.*

Tie up some stalks of tall flowers to sticks, cut these two feet long, thrust them eight inches into the ground, and let them be hid among the leaves.

Clean and rake the ground between them.

Take of the slips of auriculas, and plant them out carefully for an increase. Transplant perennial flowers and evergreens, as in the former months; and take up the roots of colchicams, and other annual bulbous plants.

Sow French honeysuckles, wallflowers, and other hardy plants, upon the natural ground; and the tenderer kinds on hot-beds. Transplant those sown last month into the second hot-beds. Plant some tuberose in a moderate hot-bed, and sow carnations and pinks on the natural ground or open borders.

##### *Kitchen garden.*

Plant the large crop of French beans, and chuse for them a dry warm border. Plant cuttings of sage and other aromatic plants. Sow marrowfat pease, and plant some beans for a late crop.

Sow thyme, sweet marjoram, and savory.

Prepare



Prepare dung for making ridges to receive the cucumber and melon plants designed for bell or hand-glasses.

Sow young sallading once in ten days; and sow some cos Silesia lettuces.

The seeds of all kinds being in the ground, look to the growing crops. Clear away the weeds every where among them, and dig up the earth between the rows of beans, peas, and all other kinds that are planted at distances. This gives them a strong growth, and brings them much sooner to perfection, than can be made by any other method.

Draw up the mould to the stalks of the cucumbers and cauliflower plants; and in cold nights cover the glasses over the early cucumbers and melons.

*Orchard and fruit garden.*

Look to the fruit trees against walls and espaliers. Take off all fore right shoots, and train such as rise kindly.

Thin apricots upon the trees, for there are usually many more than can ripen; and the sooner this is done, the better the others succeed.

Water new planted trees.

Plant cuttings of vines, and look over the grown ones. Nip off improper shoots. When two rise from the eye, always take off the weakest.

Weed strawberry beds; cut off the strings: stir the earth between them; and once in three days water them.

Dig up the earth in the borders near fruit trees. Never plant any large kind of flowers or kitchen things upon them; And it is better if nothing be sown or planted on these borders, they all starve the fruit.

**M A Y.**

*Pleasure garden.*

Observe where the leaves of sowbreads are decayed, take up the roots, laying them carefully by till the time of planting.

Take up the hyacinth roots which have done flowering, and lay them sideways in a bed of dry rich mould leaving the stem and leaves out to die away: this practice greatly strengthens the roots.

Roll the gravel walks carefully and frequently, and keep the grass clean mowed.

Clean all the borders from weeds; take of all straggling branches from the large flowering plants, and train them up in a handsome sape.

Plant out French and African marygolds, with other autumnals

tunnals from the hot beds, the last week of this month, chusing a cloudy warm day.

Tie up the stalks of carnations. Plant cuttings of the lychnis and lychnideas, and sow the small annuals, candytuft, and Venus' looking-glass, in the open ground.

Pot the tender annuals, as balsams, amaranths, and the like, and set them in a hot bed frame till summer is more advanced for planting them in the open ground.

#### *Kitchen garden.*

Water once in two days the pease, beans, and other large growing plants.

Destroy the weeds in all parts of the ground, and dig up the earth between the rows, and about the stems of all larger kinds.

Sow small sallading once in ten days, as in the former month: and at the same time chuse a warm border, and sow some purslain; sow also endive, and plant beans and pease for a very large crop; and French beans to succeed the others. The great care in these kinds is to have their several products fresh and young throughout the season.

Chuse a moist day, and an hour before sun-set plant out some savoys, cabbages, and red cabbages, draw the earth carefully up to their stems, and give them a few careful waterings.

#### *Orchard and fruit garden.*

If any fresh shoots have sprouted upon the fruit-trees in espaliers, or against walls nip them off, and train the proper ones to the wall or pole, at due distances, and in a regular manner.

Look over the vines; stop every shoot that has fruit upon it, to three eyes beyond the fruit. Then train the branches regularly to the wall, and let such as are designed for next year's fruiting, grow some time longer; their leaves will give a proper shade to the fruit.

Water the new planted trees, and keep the borders about the old ones clear; and finally, pick off snails and other vermin.

#### JUNE.

#### *Pleasure garden.*

Chuse the evening of a mild showery day, and plant out into the open ground the tender annuals hitherto kept in pots in the hot bed frames; they must be carefully loosened from the sides of the pot, and shaken out with all the mould about them; a large hole must be opened for each, they must be placed

placed upright in it, and when settled in the ground, by a gentle watering, must be tied up to sticks.

Let pinks, carnations, and sweet williams, be laid this month for an increase. Let the layers be covered lightly, and watered every other day a little at a time.

The spring flowers being now over, and their leaves faded, the roots must be taken up and laid by for planting again at a proper season. Snow drops, winter-aconite, and the like, are to be thus managed.

The hyacinth roots, laid flat in the ground, must now be taken up, the dead leaves nipped off, and the mould; and when clean, they must be laid upon a mat in an airy room to harden and then laid by.

Tulip roots must be now taken up also as the leaves decay and the like method must be followed with anemonies and ranunculuses.

Cut the cups or pods of the carnations that are near blowing, in three or four places, that they may blow regularly.

Inoculate some of the fine kind of roses.

*Kitchen garden.*

Transplant the cauliflower plants soon in May. Give them a rich bed and frequent waterings.

Plant out thyme and other savoury plants sown before and in the same manner shade and water them.

Take the advantage of some cloudy weather to sow turnips; and if there be no showers, water the ground once in two days.

Sow brocoli upon a rich warm border, and plant out celerery for blanching. This must be planted in trenches a foot and a half deep, and the plants must be set a foot asunder in the rows.

Endive should also be planted out for blanching; but in this the plants should be set fifteen inches asunder, and at the same time some endive seed must be sown for a second crop. Pick up snails; and in the damp evenings kill the naked slugs.

*Orchard and fruit garden.*

Repeat the taking off fore right shoots upon walls and espalier trees, which we directed last month; train proper branches to their situation, where they are wanted, once again thin the wall fruit; leave nectarines at four inches distance, and peaches at five; none nearer; the fruit will be finer and the tree stronger for next year.

Inoculate the apricots, and chuse for this operation a cloudy evening.

evening. Water new planted trees, and pick up snails and vermin.

## JULY.

### *Pleasure garden.*

Roll the gravel frequently, and mow the grass.

Clip box edging; cut and trim hedges; and look over all the borders; clearing them from weeds, and stirring up the mould between the plants.

Innoculate roses and jessamines of all the kinds that require this propagation; and any of the other flowering shrubs.

Take up the roots of fritillaries and maragons, and others of this sort that are past flowering some time.

Gather the seeds of the flowers you design to propagate, and lay them upon a shelf in an airy room in the pods. When they are well hardened, tie them up in paper bags, and do not take them out of the pods till they are to be sown.

Lay pinks and sweet-williams, as the former, in earth. Cut down the stalks of those plants which have done flowering, and which you do not keep for seed; and tie up these now coming into flower to sticks, as we directed for the earlier kinds.

Sow lunines, larkspurs, and the like, on dry, warm borders, to stand the winter, and flower early next year.

### *Kitchen garden.*

Sow a crop of French beans to come in late, when they will be very acceptable.

Clear the ground from weeds.

Dig between the rows of beans and pease, mow the ground also about the artichokes among the cabbage kinds.

Water the crops in dry weather.

Spinage seed will be ready for gathering now, as also that of the Welch onion, and some others; take them carefully off, and dry them in the shade.

Take up large onions, and spread them upon mats to dry for the winter.

Clear away the stalks of beans and pease that have done bearing.

Watch the melons as they ripen, and give them very little water.

Water cucumbers more freely.

### *Orchard and fruit garden.*

Inoculate peaches and nectarines.

Take



Take off all fore right-shoots in the espalier and wall fruit-trees.

Hang phials of honey and water upon the fruit trees, and look carefully for snails. Keep the borders where the fruit trees stand, clear from weeds, and stir the earth about them. This will greatly assist the fruit in ripening.

Look to the fruit trees ; that have been grafted and budded the last season. See that there are no shoots from the stocks.

Whenever these rise take them off, for they will rob the intended growth of its nourishment.

Look carefully to the new planted trees ; water them often, and whatever shoots they properly make, fasten to the wall or espalier.

Repeat the care of the vines, take off improper shoots, and nail any that are loose to the wall. Let no weeds rise in the ground about them, for they will exhaust the nourishment and impoverish the fruit.

## AUGUST.

### *Pleasure garden.*

See whether the layers of sweet-williams, carnations, and the like be rooted : transplant such as are, and give frequent gentle waterings to the others to promote it.

Dig up a mellow border, and draw lines at five inches distance lengthways and across : in the centre of these squares plant the seedling polyanthuses, one in each square.

In the same manner plant out the seedling auriculas. Shade them till they have taken root, and water them once in twenty four hours.

Cut down the stalks of plants that have done flowering, and save the seeds you want as they ripen.

Water the tender annuals every evening.

So anemonies and ranunculus, as also fritillary, tulip, and narcissus seed.

Dig up a border for early tulip-roots, and others for hyacinths, anemonies, and ranunculus. Sow annuals to stand through the winter, and shift auriculas into fresh pots.

### *Kitchen garden.*

Sow some spinage upon a rich border, and on such another sow onions. Those two crops will live through the winter unless very severe, and be valuable in spring. The second week in August sow cabbage-seed of the early kinds and a week after that sow cauliflower seed. This will afford plants that are to be nursed up under bell-glasses in the winter.

Some of these may also be ventured in a very well defended situation open. The last week of this month sow another crop, to supply the place of these in case of accidents: for if the season be very severe they may be lost, and if very mild they will run to seed in spring. These last crops must be defended by a hot-bed frame, and they will stand out and supply deficiencies.

Sow lettuces, the cabbage and brown Dutch kinds in a warm and well sheltered piece of ground.

Transplant some of the lettuces sown earlier in warm and well sheltered borders.

Take up garlick, and spread it on a mat to harden; in the same manner take up onions and rocamble; and at the latter end of the month shalots.

#### *Orchard and fruit garden.*

Watch the fruit on your wall-trees, and keep off devourers, of which there are numberless kinds now swarming about them. Shoot all birds, pick up snails, and hand bottles of sweet water for flies and wasps.

Fasten loose branches, and gather the fruit carefully as it ripens.

Once more go round the vines, and pull off those trailing branches so very luxuriantly produced at this time. See that the fruit is not shaded by loose branches, and keep the borders clear of weeds. This tends more than is imagined to the well ripening of the fruit.

### SEPTEMBER.

#### *Pleasure Garden.*

A new kind of work begins this month; which is preparing for the next season. Tear up the annuals that have done flowering, and cut down such perennials as are past their beauty, bring in other perennials from the nursery beds, and plant them with care at regular distances.

Take up the box edgings where they are out grown their proper size, and part and plant them afresh.

Plant tulips and other flower roots.

Slip polyanthuses, and place them in rich shady borders.

Sow the seeds of flower-de-luces and crown imperial, as also of auriculas and polyanthuses, according to the method we delivered before.

Also part the roots of flower-de-luces, piony, and others of these kinds. In the last week transplant hardy flowering shrubs: and they will be good next summer.

*Kitchen.*

*Kitchen garden.*

Sow lettuces of various kinds, Silesia, cos, and Dutch; and when they come up, shelter them carefully. The common Practice is to shelter them under hand-glasses; but they will thrive better under a sloping reed-hedge, such as we described before.

Make up fresh warm beds with the dung that has lain a month in the heap. Plant the spawn in these beds upon pasture mould, the same they were found in; and raise the top of the bed to a ridge, to throw off wet.

Look to the turnip beds and thin them, leave the turnips at six inches distance.

Weed the spinage, onions, and other new sown plants.

Transplant sage, lavender, and sweet plants, earth up the cellery as it grows up in height.

Sow young salading upon warm and well sheltered borders.

Clean asparagus beds in this manner:—Cut down the stalks, and pare the earth off the surface of the alleys, throw this upon the beds half an inch thick, and sprinkle over it a little dung from an old melon bed.

Dig up the ground where summer crops have ripened: and lay it in ridges for the winter. These should be disposed east and west, and turned once in two months; they have thus the advantage of a fallow.

Plant some beans and sow some pease on warm and well-sheltered borders, to stand out the winter.

*Orchard and fruit garden.*

The fruit must now be gathered with care every day, and the best time is an hour after sun rise. Then it should be laid in a cool place till used. Such as is gathered in the middle of the day is always flabby.

Keep birds from the grapes, for as they now begin to ripen they will be in continual danger.

Transplant goosberries and currants; and plant strawberries and raspberries; they will be rooted before winter, and flourish the succeeding season.

**OCTOBER.**

*Pleasure garden.*

Let all the bulbous roots for spring flowering be put into the ground; narcissus, maragon, tulips, and such ranunculus and anemonies as were not planted sooner.

Transplant columbines, monkshood, and all kinds of fibrous rooted perennials.

Place the auriculas and carnations that are in pots under shelter.

Some lay the pots on one side, but that spoils the bud for next year's flowering. The best way is by means of a sloping reed hedge. Dig up a dry border, and if not dry enough naturally dig in some sand. In this set the pots up to the brim. Place the reed hedge slopping behind them, and fasten a mat to its top that may be let down in bad weather.

Take off the dead leaves of the auriculas before they are thus planted.

Bring into the garden flowering shrubs wherever they are wanted, and at the end of the month prune some of the hardier kinds.

#### *Kitchen garden.*

Plant out the cauliflower plants where they are to be sheltered, and it will be proper to plant two for each glass, where that method is used, for fear of one failing.

Sow another crop of pease, and plant more beans: chuse for these a dry spot and well sheltered from the cold winds of winter.

Transplant the lettuces sowed last month, where they can be defended by a reed hedge, or under walls.

Transplant cabbage plants and coleworts where they are to remain.

Take great care of the cauliflower plants sown early in summer; they now begin to shew their heads, break in the leaves upon them to keep off the sun and rain; it will both harden and whiten them.

#### *Orchard and fruit garden.*

Prune the Peach and nectarine trees and the vines. This is a very useful practice, for it strengthens the buds for spring.

Cut grapes for preserving, with a joint of the vine to each bunch.

Gather fruits for winter keeping as they ripen. Transplant all garden trees for flowering; prune currant bushes and preserve the stones of fruit for sowing.

### NOVEMBER.

#### *Pleasure garden.*

Throw together a good heap of pasture ground, with the turf among it, to rot for mould for the borders.

Transplant



Transplant honeysuckles and spireas, with other hardy flowering shrubs.

Rake over the beds of seedling flowers, and strew some peas straw over them to keep out the frost.

Cut down the stems of perennials which have done flowering; pull up annuals that are spent, and rake and clear the ground.

Place hoops over the beds of ranunculus and anemonies, and lay mats or cloth in readiness to draw over them in case of hard rains or frost.

Clean up the borders in all parts of the garden, and take care to destroy not only weeds, but all kinds of moss.

Look over the seeds of those flowers which were gathered in summer. See they keep dry and sweet, and in a condition of growth, and dig a border or two for the hardier kinds.

*Kitchen garden.*

Weed the crops of Spinage and such other kinds as were sown late, for the wild growth will else smother and starve the crop.

Dig up a border under a warm wall, and sow some carrots for spring; sow radishes in such another place, and see the ground be well and deep dug for both. Turn the mould that was trenched and laid up for fallowing; this destroys weeds, and prepares the soil to be enriched by the air.

Prepare some hot-beds for salading. Cover them five inches with mould, and sow upon them some lettuces, and the common small sallading, mustard, rape, cresses, and radishes.

Plant another crop of beans; and sow more pease for a succession.

Trench the ground between the artichokes, and throw a thick ridge of earth over the roots. This will preserve them from frost, and prevent their shooting at an improper time.

Make a hot-bed for forced asparagus.

Take carrots and parsnips, and lay them in sand to be ready for use. Give air at times to plants under hand glasses and in hot beds, or they will suffer as much by want of that, as they would have done by the frost.

*Orchard and fruit garden.*

Stake up all trees planted for standards, or the winds will rock them at the bottom, and the frost will be let in and destroy them.

Throw a good quantity of pease straw about them, and lay

lay on it a good quantity of brickbats or pebbles to keep it fast: this will mellow the ground, and keep out the frost.

Continue to prune wall fruit trees, and prune at this time also the apple and pear kinds. Pull off the late fruit of figs, it would decay and rot the branches.

## DECEMBER.

### *Pleasure garden.*

Draw the mats and cloths over the ranunculuses and anemony beds in severe weather, whether frost or cold rains; but give them air in the middle of every tolerable day, and as soon as possible uncover them all day; but draw on the mats against night.

Throw up the earth where flowering shrubs are to be planted in the spring; and once in a fortnight turn it.

Dig up the borders that are to have flower roots planted in the spring, and give them the advantage of a fallow, by throwing up the ground in a ridge, scatter over it a very little rotten dung from a melon bed, and after this turn it twice during the winter.

Look over the flowering shrubs and prune them. Cut away all dead wood, shorten luxuriant branches, and if any cross each other, take away one. Leave them so that the air can have a free passage between them.

Sift a quarter of an inch of good fresh mould over the roots of perennial flowers whose stalks have been cut down, and then rake over the borders. This will give the whole an air of culture and good management, which is always pleasing.

### *Kitchen garden.*

Plant cabbages and savoy for seed. This is to be done with great care, dig up a dry border, and break the mould very well; then take up some of the stoutest cabbage and savoy plants: hang them by the stalks five days, and then plant them half way of the stalk into the ground, draw up a good quantity of the mould about the part of the stalk that is out of the ground, and make it into a kind of hill round each; then leave them to nature.

Sow another crop of pease, and plant another parcel of beans to take their chance for succeeding the others.

Make another hot bed for asparagus, to yield a supply when the former is exhausted. Continue to earth up cellery, and cover some endive with a good quantity of pease straw as

it

it is growing, that you may take it up when wanted, which otherwise the frost will prevent.

*Orchard and fruit garden.*

Prepare for planting trees where they will be wanted in spring, by digging the ground deep, and turning it well now in the places where they are to stand.

Scatter over the borders where the fruit trees are planted some fresh mould, and some old dung, and in a mild day dig it in with a strong three pronged fork.

Look over the orchard trees; and cut away superfluous and dead wood. Let the branches stand clear of one another, that the air can get between; and the fruit will be better flavoured.

This is the management of old trees, and new planted ones are to be preserved by covering the ground at their roots.

The FAMILY's best COMPANION; giving Instructions how to Pickle and Preserve, to make divers Sorts of Wine of our English Product; together with excellent and approved medicines, Salves, &c. necessary in all Families.

**A**S many things have been spoken to for the information of the younger sort of the male kind, so it may not be amiss to say some small matter in relation to the instruction and benefit of the female kind. And first,

*Of Pickling, Preserving, Candyng &c.*

*To pickle cucumbers.*

**WASH** them, and dry them in a cloth: then take water, vinegar, salt, fennel tops, some dill tops, and a little mace: make it sharp enough to the taste: then boil it a while, then take it off, and let it stand till cold; then put in the cucumbers, and stop them down close, and within a week they will be fit to eat,

*To pickle cucumber's green.*

**Take** two quarts of verjuice or vinegar, and a gallon of fair water, a pint of bay salt, a handful of green fennel or dill; boil it a little, and when cold put it into a barrel, and then put the cucumbers to the pickle, and you may keep them all the year.

*To*

*To pickle French beans.*

Take them while young, and cut off the stalks; then take good vinegar, and boil it with pepper and salt; season it to your palate, and let it stand till cold; then take the beans, and put them into a stone jar, placing dill between the layers; and then put in the pickle and cover them close for three weeks; then take the pickle, and boil it again, and put it to the beans boiling hot; cover them close, and when cold, they will be fit to eat.

Or French beans may be pickled thus; take your beans, and string them, boil them tender, then take them off, and let them stand till cold; then put them into a pickle of vinegar, pepper, salt, cloves, mace, and a little ginger.

*To pickle eldern, or any other buds of trees.*

Give them one or two walms with vinegar, salt, whole pepper, long mace, and a little lemon peel in pieces; then drain them, and let the buds and liquor cool separately: afterwards put them into a jar, and cover them with your pickle.

*To pickle walnuts to eat like mangoes.*

Take green walnuts before the shell is grown to any hardness in them; pick them from the stalks and put them into cold water, and set them on a gentle fire till the outward skin begins to peel off: then with coarse cloaths wipe it off; then put them into a jar, and put water and salt therein, shifting it once a day for ten days, till the bitterness and discolouring of the water be gone; then take a good quantity of mustard seed, which beat up with vinegar till it becomes coarse mustard, and then take some cloves of garlic, some ginger, and a little beaten cloves and mace; make a hole in each nut, and put in a little of this; then take white wine vinegar, and boil them together, which put to the nuts boiling hot, and some pepper, ginger, cloves, and mace, as also some of the mustard and garlic, which keep close stopped for use.

*To pickle mushrooms.*

First blanch them over the crowns, and barb them beneath; then put them into a pan of boiling water, then take them forth, and let them drain; when they are cold put them into your jar or glass, and put to them cloves, mace, ginger: nutmeg, and whole pepper: then take white wine, a little vinegar, and salt: So pour the liquor into the mushrooms, and stop them close for use.



*To pickle any sort of flowers for sallads, as clove-gilly flowers.*

Put them into a gally-pot, with as much sugar as they weigh; fill them with wine vinegar; to a pint of vinegar a pound of sugar.

*To pickle samphire, broom buds, asben-keys, purslain, &c.*

Take samphire, and pick the branches from the dead leaves: then lay it in a pot, and make a strong brine of water and bay salt: In the boiling scum it clean; being boiled, and cold, put it to the samphire; cover it, and keep it for all the year; and when there is occasion to use it take and boil it in fair water, but the water must boil before you put it in: and when it is boiled and become green, let it cool; then take it out, and put it into a wide mouthed glass, and put strong wine vinegar to it, and keep it close for use.

*To pickle lemon and orange peel.*

Boil them in vinegar and sugar, and put them into the same pickle: observe to cut them in small long thongs, the length of half the peel of your lemon: It ought to be boiled in water before it is boiled in vinegar and sugar.

*To preserve green apricots.*

Take them when they are small and tender; peel them and put them in hot water, but let them not boil; let them lie there till they begin to be green, then take them out and put them in cold water, then boil your sugar, and let your apricots run a little of the water from them; then put them into the sugar, and let them boil till the syrup becomes thick; then put them into an earthen pan, and let them remain there a week; then put them into a preserving pan, and make them boil again till the syrup grows thick; then put them once more into an earthen pan, and let them stand till they are cold; then take them out of their syrup, and lay them on your ardoise; then dry them in your stove, and turn them often till dry; then put them in boxes on paper.

*To preserve fruit green.*

Take pippins, apricots, pears, plumbs, or peaches, when they are green; scald them in hot water, and peel them; then put them in another water not so hot as the first; then boil them very tender, and take the weight of them in sugar, and put to them as much water as will make a syrup to cover them: then boil them somewhat leisurely, and take them up;

up; then boil the syrup till it be somewhat thick, and when cold put them together.

*To preserve raspberries.*

Take good raspberries that are not too ripe but very whole, take away the stalks, and put them into a flat bottomed earthen pan; boil sugar, and pour it over your raspberries, then let them stand to be cool, and when they are cold, pour them softly into your preserving pan, and let them boil till their syrup be boiled pretty thick; scum them very well in the boiling: this done, put them into pots, and when cold, cover them up close for use.

*To preserve barberries.*

Take one pound of barberries pickled from the stalks, put them into a pottle pot, and set it in a brass pot full of hot water, and when they are stewed strain them, and put to the barberries one pound and a half of Sugar, and then put a pint of red rose water, and boil them a little; then take half a pound of the fairest clusters of barberries you can get, and dip them in the syrup while it is boiling; then take the barberries out, and boil the syrup till it is thick, and when cold, put them in glasses with the syrup.

*To preserve currants.*

Lay a layer of currants, and then a layer of Sugar, and so boil them as before prescribed for raspberries; scum them boiling till the syrup is pretty thick; then take them off and when they are cold, put them in gally-pots or glasses closely stopped.

*To preserve walnuts green.*

Boil the walnuts till the water tastes bitter, then take them off, and put them in cold water; peel off the bark, and weigh as much sugar as they weigh, and a little more water than will wet the sugar; set them on the fire, and when they boil up take them off, and let them stand two days, and then boil them again.

*To preserve cherries.*

First, take some of the worst cherries, and boil them in fair water, and when the liquor is well coloured, strain it, then take some of the best cherries, with their weight in beaten sugar; then lay one layer of sugar, and another of cherries, till all are laid in the preserving pan; then pour a little liquor of the worst cherries into it, and boil the cherries

till they are well coloured; then take them up, and boil the syrup till they will button on the side of the plate; and when they are cold put them in a glass close covered for use.

*To candy cherries.*

Take cherries before they be full ripe, and take out the stones: then take clarified sugar boiled to a height, and pour it to them.

*To candy pears, plumbs, apricots, &c.*

Take them, and give every one a cut half through; then cast sugar on them, and bake them in an oven, as hot as for manchet, close stopped; let them stand half an hour, then lay them one by one upon glass plates to dry, and they will appear very fine and clear. In this manner you may candy any other fruit.

*To pickle flowers.*

Pick them very clean, and to every ounce of flowers put two ounces of hard sugar, and one ounce of sugar candy, and dissolve them in rose-water, then boil them till they come to sugar again, and when it is almost cold, put in your flowers, and stir them together, &c.

*Of the making sundry Sorts of English Wines.*

*Currant wine.*

**P**ICK the currants, when they are full ripe, clean from the stalks, then put them into an earthen vessel, and pour on them fair and clean hot water, a quart of water to a gallon of currants; then bruise or mash them together, and let them stand and ferment: then cover them for twelve hours, strain them through fine linen into a large earthen jar, and then put the liquor into a cask, and thereto put a little ale-yeast, and when worked and settled bottle it off: This is exceeding pleasant, and very wholesome for cooling the blood: in a week's time it will be fit for bottling.

*Artificial claret.*

Take six gallons of water, two gallons of the best cyder and thereto put eight pounds of the best malaga raisins, bruised; let them stand close covered in a warm place for two weeks stirring them every two days well together; then press out the liquor into a vessel again, and add to it a quart of the juice of barberries, and a pint of the juice of bramble-berries, or raspberries, (which perhaps is the best) to which

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put a pint of the juice of black cherries; work it up with mustard-seed, covered with bread paste for three or four days by the fire-side; after which let it stand a week; then bottle it off, and it will become near as good as, if not exceed, common claret.

*Goosberry wine.*

The best way is to take to every three pound of fruit, one pound of sugar, and a quart of fair water; boil the water very well, but you must put the aforesaid quantity of sugar when it is boiled; bruise the fruit, and steep it twenty-four hours in the water: stir it sometimes, then strain it off, and put the sugar to it, and let it stand in a rundlet close stopped for a fortnight; then draw it off, and set it up in a cool cellar, and in two months it will be fit to drink.

*Rasherry wine.*

Take the raspberries clear from the stalk; to a gallon of which put a bottle of white wine, and let them infuse in an earthen vessel two or three days closely covered: then bruise the berries in the wine, and strain them through fine linen gently: then let it simmer over a moderate fire, scum off the froth, and then strain it again, and with a quarter of a pound of loaf sugar to a gallon, let it settle; Then in half a pint of white wine boil about an ounce of well scented cinnamon, and a little mace, and put the wine strained from the spice into it, and bottle it up.

*Damson wine.*

Dry the damsons in an oven after you have drawn your bread, then to every quart of damsons put three quarts of fair water, but first-boil it very well; then put the water and damsons into a rundlet with sugar, and having stood a time sufficient, bottle it off.

*Wine of grapes.*

When they are fully ripe, in a dry day pick off those grapes that are ripest, and squeeze them in a vat or press made for that purpose, in which must be a fine canvas bag to contain the grapes; and when in the press do not squeeze them so hard as to break the stones, if you can help it, because the bruised stones will give the wine a disagreeable taste; then strain it well, and let it settle on the lees, in such a cask or vessel, as you may draw it off without raising the bottom: then season a cask well with some scalding water, and dry it



or scent it with a linen rag dipped in brimstone, by fixing it at the bounge, by the bung or cork; then put the wine into it, and stop it close for 48 hours, then give it vent at the bounge, with a hole made with a gimblet, in which put a peg or saucet that may easily be moved with the fingers; then in about two days time close it up, and in about two or three months time it will be fit for drinking, and prove almost as good as French wine,

*Wine of strawberries or raspberries.*

Mash the berries, and put them into a linen bag, as above said, for the grapes, and squeeze them into a cask, and then let it work as aforesaid in the grape receipt, &c. In this manner may cherry wine be made; but then you must break the stones, contrary to what was said concerning the grapes.

*A short way for cherry wine.*

Squeeze the juice of cherries into a cask and thereto put a small quantity of sugar, corresponding to the quantity of juice, and when it has stood a month, it will be a pleasant liquor.

*Black cherry wine.*

In the same manner, take a gallon, or more of the juice of black cherries, and keep it in a vessel close stopped till it works: and after it is fine, add an ounce of sugar to each quart and a pint of white wine.

*To make cyder.*

Grind, stamp, or pound your apples, and put them into a press, and squeeze them through hair bags into a tub: and let it settle, and according to your quantity of juice, put in some sugar at discretion: then work it up with ale-yeast, and let it stand a week; then prepare your vessels according to the quantity, clean and dry; then put it up; after which put into a bag two pounds of ston'd raisins, two ounces of whole ginger, and two ounces of ising glass, and and see it tied tight with a strong string fixed without side of the barrel, that the bag may sink to the bottom, and after two months it will be fit for use:

*Mead.*

Take six gallons of water, and thereto put six quarts of honey, stirring it till the honey be thoroughly mixed; then set it over the fire, and when ready to boil scum it very well: then put to it one quarter of a pound of mace, and as much

ginger, and half an ounce of nutmegs, some sweet marjoram, thyme, sweet briar, together, a handful; boil them in the liquor, then let it stand by till cold, and then barrel it up for use.

*Of jellies.*

Let them be of apples, currants, rasberries, &c. Take out the clear liquor, (when squeezed), and boil it with sugar till it is as thick as jelly; then take it up in glasses.

*Family Medicines.*

*Almonds of the ears fallen down.* Take a little bole armoniac in powder, and with it mix some venice turpentine, and spread it on sheeps leather as broad as a stay, and apply it under the throat from ear to ear.

*Ague.* Drink the decoction (that is the boiling of any herb) of camomile, and sweeten it with treacle; which drink when warm in bed, and sweat two hours. Or, to the wrist apply a mixture of rue, mustard, and chimney soot, by way of plaister.

*Asthma, or shortness of breath.* Take a quart of aquavivæ one ounce of anniseed bruised, one ounce of liquorice sliced, half a pound of stoned raisins, and let them steep ten days in the above mentioned manner; then pour it off into a bottle, with two spoonfuls of fine sugar, and stop it very close.

*St Anthony's fire.* Take a purge, and anoint the place with the marrow of mutton.

*Bruise or scald outward.* Take a quart of neats foot oil, half a pound of red lead, two ounces of bee-wax; boil them together three hours, and stir them well.—Or, oil of elder, bathed or rubbed on the place will have the same effect.

*Bruises inward.* Drink the Decoctions of comfrey with bread and butter.

*Bound in the body.* Take cream of tartar mixed with honey very frequently.

*Biles or sores.* Eat rosemary and sage with bread and butter, and apply wheat flower and honey by way of plaister.

*Bloody flux.* Take as much linen cloth as will make a suppository; being wrapt round buttonwise wet in the best aquavivæ, or aqua composita; which properly applied, will help them in two or thre applications. This is an approved and sure medicine.

*Bleeding at the nose.* Put into your nostrils coney wool rolled in bole armoniac,

*To purge the blood.* Drink often of the tea of ground ivy or of sassafras chips.

*Canker in the mouth.* Take the juice of plantain and rose water mixed, and with it frequently wash your mouth.

*For a cough.* When you are going to bed, drink brandy treacle, and sallad oil, mixed; or take a mixture of butter and brown sugar.

*Convulsions in Children.* Take unslaked lime one quart and to it put five quarts of spring water; let it stand 24 hours, in which time stir it three times, scum it and take the clear water, and let it stand 12 hours more, and strain it through a cloth; and being put into an earthen pot, put to it anniseeds and fennel seeds, of each a quarter of a pound; liquorice and sassafras of each an handful: let them stand four or five days, and then let the child drink a quarter of a pint morning and evening, as long as it lasteth.

*Consumption.* Take as much new milk as a common still will hold, to which put the herbs following; viz. hyssop, cowslip leaves, horehound, and colt's foot, of each a handful: and of maiden's hair one ounce; let them stand all night, then still them off: and when it is to be drank, sweeten it with syrup of cowslip, or good sugar.

*Cholic.* Beat the hips of wild roses (gathered in winter) into powder, and half as much sliced nutmeg; mix them, and take some in all your drink; this is an excellent remedy.

*To cure drougt in the ague.* Take a small quantity of burriage, sorrel, violet-leaves, and strawberry leaves; seethe them in two quarts of fair running water till it consume to one quart; then take almonds and blanch them, when beaten, put them to the said water, and to it put a little sugar, and drink it warm.

*Dropsy.* Take broom ashes and mustard seed steeped in a pint of white wine: of which drink often. *Approved.*

*For a sorethroat.* Take columbines and cinquefoil stamp, and strain them into milk, and drink it very warm.

*For the gripes.* Take a sliced nutmeg in a quartern of brandy warmed over the fire; to which put the beaten yolk of an egg with a little water or sugar; stir them together over the fire to thicken a little: Take it at night going to bed.

*For the stone, or stoppage of urine.* Take a quantity of thyme, parsley, tops of fennel, and cinquefoil a little quantity, five or six cloves of garlic; stamp them altogether and strain them into white wine, or ale, and drink of it morning and evening.



*To cause an appetite.* Seethe century in fair water, and drink it in a morning fasting, to the quantity of nine spoonfuls, lukewarm for three days.

*An easy and safe purge.* Take cream of tartar an ounce; jalap and brimstone of each a quarter of an ounce: the jalap must first be beaten into fine powder; and mix them thoroughly together in a mortar: but if the person be hard to work on, put two drams of jalap more.

*Smallpox.* When warmin bed, drink mulled ale with mary-gold flowers, and sweat a little to bring them thoroughly out, and to keep them from sinking, take brimstone and treacle.

*For the itch.* Take frankincense and beat it small, and mingle it with oil of bays, and therewith anoint all over.

*For a burn or scald.* Take oil of eldern; and anoint the place: This is a sure remedy.

*Against the fever.* Take a handful of bay leaves, and a large handful of red sage; seethe them in two quarts of ale, till they come to one, and let the patient (being in bed) drink thereof a good draught warmed with a little sugar.

*To make an approved ointment for old sores, &c.* Stamp smallage, and add to it some aquavivæ and bears grease: stir them well together, and anoint the place before the fire, evening and morning.

*To make mililot, excellent for plaisters.* Take mililot pimpernel, and scabions, of each two handfuls: cut them small then beat them in a mortar with two pounds of hog's lard, let it stand in the sunshine seven or eight days, (it being usually made in June) then melt and strain it well; then add as many more fresh herbs; and set it in the sun as before, and then melt and strain it again; then boil it till the juice is consumed; then take it off the fire, and put it to beaten rosin, bees wax, and Venice turpentine, of each one ounce; when cold put it up in pots, or make it up in rolls.



*A Monthly List of all the Fairs in England and Wales, in which all the moveable Fairs are fixed to their certain Days.*

**JANUARY** 1 Charlbury. 5 Redburn, 8 Preston. 10 Cawston Drongfield  
Sleaford 11 Howden Salisbury 12 Landoverly 14 Lavenog Nottingham  
15 Pontefract 17 Buckingham Tavistock 18 Banwell Grampound Melton-  
Mowbray Potton Teignmouth 20 Banbury 22 Banham 24 Shefford 25  
Bingley Bodmyn Bristol Chesterfield Churchingford Kington Leighton  
(Bedf.) Plymouth Weafenham Whittlesea (Ile of E) 26 Adwalton Knerf-  
borough Leek 27 Rippon 28 Langollen.

Feb. 1 Higham Ferrers Reading 2 St Blazy Eversham Forrington Lif-  
ton Lyme Lynn (Mort) Poult Kadiand Saltrash Wymondham 3 Bale Bath  
Bromley Dereham Elmington 5 Lannerchymeadd Pontefract 7 Gnappe  
St Silin Hovey 8 Chirk Egton Heref. Stanf. 9 Landaff 10 Chapel-In-le-  
Firth Beverly 11 Leybourn Laudyfkel 12 Dorcheit. 5 Ashbourn Beconsf  
Beaumaris Biddleford Biggleswade Brandon Budworth Camrals Cardigan  
Devizes Flint Frampton Godalming Hambledon Headon Leominster Looe  
Maidstone Mold Northallerton Slaidhorn Tutbury 17 Bridgenorth Con-  
gletton Stafford Workingham 18 Long-preston 19 South-Moulton Weldon  
21 Berkhamstead Bingham Colehill (Staff. and Warw.) Liskeard Litch-  
field Northampton Thirsk 22 Botley Bury. (Lane.) Caegwiley Danbury  
Hartly Row Stone Tregony 24 Bildestone Campden Dunstable 25 ton Exe-  
ter Falkingham Roylton Tetbury Tunbridge 24 Banbury Cambrone  
Eglwysack Frome Henley (Oxen) Ire by Pocklington Stoke (Staff.) Teign-  
month Wallshall 25 Ashbittle Burnham (Bucks) Carnary Deby Fever-  
ham Lanerillo Landsehel Oundle Plympton Ruabon Westbury 26 Ad-  
walton 28 Abingdon Chertsey Chesterfield Winton.

March 1 Adleburgh Bedford Colyford Seaton 2 Baldock Brackley Lip-  
hook 3 Ashburton Brigewater Fincham 4 Charlbury Frampton Giffing-  
ton Stockport 5 Bolingey Titchfield Tregarren Vantage West-Looe 7 A-  
berfraw Blanford, Bourn Buckingham Burnley Chipping-Norton Corham  
Frampton Higham-Ferrers Hingham Kirby Stephen Langport Nottingham  
Tewksb. Uppingham 10 Norton 11 Gamelford Landegla 12 Gotwen Lang-  
gadock Mydrim South-horn Sudbury Talgarth (Yorksh.) 14 Bradford.  
(Yorksh.) Landewy Northorp Poole Seaford Stamford 15 Bradford.  
(Yorksh.) Burnham (Norf.) Oakham Oswestry. 16 Bettus Caeirwyth  
Knareborough 17 Abbots-Bromley Langollen Mainbury 18 Llanfysdd.  
19 Helston Market-Jew Ruthin Shrewsb. 21 Cerne Fazley Mold Naibeth  
Philips-Norton Salisbury. Sedbergh Stamford Workshop 22 Cailecary Howden  
Leominster. Oakhampton Stone (Staff.) 23 Aylham Dolton Retford Skip-  
ton. Truro Wrexham Woodburn 24 Broomyard Clithero St Colum Eccle-  
shall Reynsham Rippon Upton Wye 25 St Alban's Ash Axbidge Bishops-  
Lydeard Carphilly Chagford Churchingford Earls Colne Grampound Great-  
Chart Henly. (Warwicksh.) Huntingdon Malpas Midhurst Newark Ox-  
braugh Rutland Stockport Wallington Wigton Woodstock Woodbridge 26  
Andover Bodmyn Feckenham Hertf. Montgom Naptwich Odham Wal-  
den 28 Grantham Liskeard Loughborough Magor Pattington Philips Nor-  
ton Preston (Lane.) Wisbeach (Ile E) 29 Alcester Chapel in le Firth  
Langernew Newn Stourbridge Wellington (Salop) 30 Market-Drayton  
31 Durham Newbridge Ottery Settle Yarm.

April 1 Bishop's Castle Reeth Snaith Stevenage 2 Abergely Alawick  
Aylebury Heltone Hitchin Lanidloes Lutterworth Malton, Newport  
(Shroph)

(Shropsh.) Richmond Shafisbury Skipton Wisbeach (Isle E.) Worcester 4  
 Auborne Belbroughton Chesterfield Elham Falkingham Frettenham Led-  
 bury Magor Minster Nefyn Poole (Montgom) Swindon Uplio 5 Bangor  
 Blythburgh Battle Bridgeport Budworth Burton Cardigan Clack Bolnbrook  
 Deal Ditching Doncaster Elmham Gloucester Hailsham Ichweil Kingclear  
 Lamberhurst (Kent) Lavendon Ludlow Moreton St Peter's Potten Plym-  
 pton Somerton Southwich Tarring Thirsk Trecafel Wadley near Farring-  
 ton Willingford Wickwater 6 Aberconwey Ivinghoe Kingston Llanvillling  
 Newent Offculme 7 Athelstone Chappel in le Firth Lannysell Malmisbury  
 Massington Norwich Nottingham Southminster Wareham Wellington (Som-  
 ersetsh.) 8 St Austle Droitwich Grinton Hackfield High Budleigh Win-  
 boura Settle 9 Burnley Pontefract Skipton 11 Attleburgh Bakewell Bar-  
 nard Castle Boxford Cockerham Darlington Dilton-Marsh Little Driffield  
 Elham Elmworth Fringinghoe Gresford Guisburn Halesowen Hockham  
 Kegworth Kelvedon Kersey Loddon Manewden Mitchell Dean Newcastle  
 (Staff) Olney Romley Shefford Sleaford Tharnbury Warminster 12 St A-  
 saph Ashby de la Zouch Basing-stock-Dowus Bedale Blackney Brailles  
 Brede Chipping Cirencest Cläre Cloeayneg Colchester Daventry Denham  
 Dorchester (Oxen) Fordtreet Frewenn Gainsborough Godmanchester Je-  
 venton Milverton Newport (Esf.) Pershore Piddletown Rochford Sand-  
 bach Scole Scotte Selby Sidmouth Skipton Slangham Sinsfold Tamworth  
 Thame Thorncomb Tornets Toulsham Turner's hill Windsor 15 Ashill  
 Harthland Heref. Holy-crofs Leek Otterton Redburn Roynton Walton  
 Wellborough Withersidge 14 Adwalton Beafes Catstreet Cawston Chel-  
 tenham Crikdale Dronefield Kettering Stamfordham Whiteney 15 Barn-  
 stable Beaulieu Derby Northampton Rothbury Slaidburn Tangley Yar-  
 mouth (Norf.) 16 Biggleswade Brackley Yarmouth (Norf.) Worcest 18  
 Castle-acre Eversham Lanelion Padstow 19 Blockley Elismere Penny-Strat-  
 ford Skipton 20 Downton Northleach Landoverly Shrewsb Stony-Strat-  
 21 Bedford Cheshem Stamford Peverell 22 Alchurch Bury (Lanc.) New-  
 port Pagnell Pontipool Settle 23 Great Bedwin Bilsden Bislely Campden  
 Chichest Cowbridge Finchamstead Gravesend Hatfield Holywell Iron Act-  
 on Modbury Norleafe Sawbridgeworth Staraway Whitechurch (Hants)  
 25 Eshover Axminster Brachnell Burnham (Esf.) Crowborough Callington  
 Guisbourn Holt (Norf.) Iron Acton King's Norton Lannerchymeadd Limp-  
 sham Landegla Lannerwest Loughborough Luton Maiden Bradley Meth-  
 would Montacute Great Oakly Oulton Pocklington Southampton Sto-  
 gumber Toddington Warkworth Wigmore 26 Caerwith Ovingham Se-  
 Settle Somerton Tamworth Tenbury 27 Abberford Burrowbridge Cerrigy-  
 Driodon Dorstone Downham Holfworthy Spalding 28 Adwalton Soham-  
 29 Churchingford Newchurch Keeth 30 Chapel in le Firth South Moulton  
 Newmarket (Flinth)

May 2. Little Brickhill Burnham (Bucks) Castlecary Charing Cleobury-  
 Mortimer Cokermonth Collyton Coventry Crowcomb Cullumpton Derby  
 Fowey Gisbrough Greenstreet Harwich Hasmere Hope Lancast Lantissent  
 Laxfield Lowest of North-Peterton Oldham Penryn Reading Redruth Ruf-  
 ford Shoreham Stockport Stoguney Stonehouse Tarperly Totneis West-  
 haddon Wingham Wirkham Wittersham 3 Aldeburgh Barton Underwood  
 Broad-cliff Bromyard Castle-Hedingham Chard Colnbrook Hambledon Hett-  
 bury Higham Terrors Highbickington Poulton Tidswell Tregony Wor-  
 stand 4 Amphill Bewdley Boston Brecon Callington Castlecombe Chagford  
 Cheddor Chesterfield Erith Elmstead Frodsham Gasp. Guilf. Harling Hen-  
 field Hequet Ipswich Liddle Northallerton Northampton North-duffield  
 Nutly Overton Probus Shapp Tamworth Tanby Torrington Wilton Woo-  
 burn Wooler Wooton-Basset Wrotham 5 Caxton Chorley Lanthiader Pen-  
 racth

raeth Mon Porloch Tenderdon 6 Amersbury Bishop's-castle Bourn Brig-  
 stock Buckingham Calne Castle Town Chawley Chipnam Chipping-Norton  
 Colshill (Staff. and Warw.) Dunmow Dunsley Gwthrin Hatfield Hunman-  
 by Kendal Knaresbrough Knighton Lewis Lifs Lannerchymead Maccles-  
 field Meer Nantglyn Oakham Pensford Pleasley Ribborough Talbridge  
 Settle Stoke under Hombden Tavistock Treganatha Uxoxeter Wern  
 Wymondam 7 Talybont 9 Braintree Crawley Dehuud Dudley Guisburn  
 Hawarden Haslingdon Holdry Holfbridge Kighley Market-Botsworth  
 Matlock Padiham Stamford Tockington 10 Allentown Caerleah Egton  
 Fring Harold Leigh E. Skip-on Solyhull 11 Akrig Crediton Dewsbury  
 Dolegelly Eglwysfach Lanidos Staines Werley-Common 12 Adwalton  
 Alfriston Alnwick Andover Bagnor West Barnsley Brading Burgh Bur-  
 wash Cawood Chelmsford Coln Congleton Corfe-Castle Crickhowel Ever-  
 shof Ewell Falkingham Haverford West Haverhill Hertford Lamborn  
 Lanfydd Lavichangel Ledbury Leicester Leighton (Huntingdonsh.) Lin-  
 field Lingfield Litch. Little-Mountain Lymington Maidstone Mithorp  
 Mold Pains-Castle Pembridge Pentre Penybent Rippon Rowland's Castle  
 Sherestone Silso Smith Stanstead St Stephen's Stoke (Suff.) Storrington  
 Stow (Gloucestersh.) Stroud Sturminster Swasham Trefosiw Touchest-  
 Tuxford Wadebridge Warwick Wendover Wenlock Wivelscomb 13 Black-  
 heath Brent Burnley Darley Flash Haverhill Lansawell Leominster Ley-  
 born Oisewstry Pwihely Rippon Sucklebridge Waltham H 14 Abergaven-  
 ny Arundel Bela Berkeley Brant-Burton Bungy Chelmsf. Chertsey Denbigh  
 Elstow Fairford Goldanger Guisburn Haltwistle Hamstreet Hartlepoole  
 Hollaway Newark Nuneaton Oakham Pembroke Pulham (Norf.) Ram-  
 sbury Rochdale Stafford Stratford (Warwicksh.) Stretton Church Tatter-  
 shall Tewksbury Theft.) Titchfield Towayn Uckfield Waltham-abbey  
 Weighton Winchelsea Woolbridge 16 Benenden Bettws Caerwily Carn-  
 narvon Chatham Eversly Guisburn Inglewhile Lanerigew Machynleth  
 Overton-RochWinchcomb 17 Ashford Brentford Bolney Emergreen Groom-  
 bridge Hay Holbeach Martihall North Moulton Newton (Lanc.) Penrice  
 Rudham Somerton 18 Abergely Alcester Brentford Dorstone Handford  
 Kingsbrumpton Leek Lansannan Morpeth Northleach Westfield Walsing-  
 ham Workington 19 Atleburgh Banbury Bawtry Beaconsfield Beauma-  
 ris Beverly Bidestone Bishop Auckland Blyth Bottishall Bovy-Tracy Bow  
 (Devon.) Brentford Bridgend Bridgeport Brighthelmstone Bures Burton  
 Chapel-Cunnon Cerne Chapel in le Firth Cheadle Cheltenham Dane-Hill  
 Devises Dicker Eccleshall Ely Eglwysfrw Farnham Findin Framsden  
 Gersfarg Grantham Hallaton Hanlope Hawkhead Helmsley Black More  
 Hereford Hundon Kidderminster Kilhampton Kirbylongdale Langodoc  
 Liston Linton Likeard Lanely Mendlesham Middlewich St Neot's New-  
 bury Newpart (Monsh.) Northwalsham St Olytn Petworth Rippon Zois  
 Saxmundham Scarborough Sheffield Southwich Stelling Stockbridge  
 Stone (Kent) Stratford Stretton Summernote Three-Lords Trew Ul-  
 verstone Wellington (Somersf.) Wern Weobly Wetherby Ulgan Winslow  
 Woodnesborough Wrexham Yarn Yaxely 20 Charbury Racham South-  
 minster Stevenage St Uley Wellow Wickham 21 Ashbourne Blackburn  
 Culmstock East-Church Hatherleigh Lamberhurst (Suffex) Sellage Sher-  
 borne Spuiti Trecast Wainfleet Weldon Whitelmeith 23 Abbots Bromly  
 Albrighton Applethaw Bradfield Bridlington Broomhall Criceth Dork-  
 ing-Dunstable Fletching Grays Guesling Hallaton Hindon Hornham Land-  
 wnog Maenelochog Preston (Kent) Ruston Sudbury Spilsby Swindon  
 Thorpe Witbeach (Isle E) Witham Wragby 24 Belford Cerwen Hudders-  
 field Kidwely Lanvilling Louth Mark Marshfield Testinwig Woods, Car-  
 ner 25 Abberford Boduyn Cuckfield Market-Deeping Newent Sandhurst  
late wib.



Shresh. Spaldick 26 Alston Astwich Brough Camelford Donnington Kirk-  
 Oswald Malmshury 27 Chipping-Norton Horsted Kayness Pett Ruthyn-  
 Thaxted. 28 Appleby Booth St Germain's Malton Nefyn Newport (Salop)  
 Norwich Skipton Stagshawbank Wisbeach (Isle E.) 29 Ackhole A-  
 menham Appleby Adingly Bakewell Battle Berkhamstead Biggleswade  
 Billinghurst Binegar Blackburn Bransbury Brixworth Bromyard New-  
 Buckenham Bury Cartmel Chiche Coltrishall Cranbrook Cramer Crowle  
 Darlington Little Dean Little Driffield Dunster Eltham Eyecliam Exeter  
 Eye Framlingham Hadleigh Ham near Richim. Harlow Hawes Hellstone  
 Hemphall Hitchin St Ives (Hunt) Kington Landaff Launceston Lawhaden  
 Lanymyneck Manchest. Marsh in the Isle of Ely Mayfield Newcastle (Staff)  
 Newport (Hants) Ormskirk Oundle Portbury Rochest Rosley-Hill and  
 every fortnight after till Sept. 28 at ditto, Rothberry Rotherham Rush-  
 ton Salisbury Sittingbourne Sleaford Southwell Spilsby Stoke (Suff.)  
 Tarling Toller-down Turkely Walsingham Wandsworth Warlop Welling-  
 ton (Suff.) Wells Westbury (Wiltsh.) West Hoathly White church (Salop)  
 Widdow York 31 Alford Ashby de la Zouch Bampron (Devon.) Bedale  
 Binegar Botely Bostead Buckland Castle Cary Coggeshal Cuckfield Durham  
 East-church Elmstere Elmsett Ep. ing Farrington Giffbrough Hatfield Pa-  
 varel Hastings Hempton Henly (Warw.) Hingham Great Hollingbury  
 near Woodside Green Landoverly Leighton (Bedff.) Lews Langollen Mel-  
 ford Melton Mowb Midhurst Monmouth Newark Newmarket (Suff.) Or-  
 tery Panwich Pembury Penrith Purleigh Rochdale Salib. Stone (Staff.)  
 Talgarth Tenby Tillingham Waldershare Walshall Wandsworth Warn-  
 ham Weet-wood Bank near Wooler West-Mercy Woodstock Yardley.

June 1. Ambleside Barnard-Castle Basingstoke Caister Kirkby Moorefield  
 Lampeter Leek Lenton near Nottingham Landibea Ludlow Maidenhead  
 Minehead Newic Redburn Royston Steple South Harting Traro Wand-  
 worth Wellingborough 2 Adwalton Alphington Ashburton Askrig St An-  
 side Birmingham Bow (Midd.) Buckingh. D'naismddy Henley (Oxon.)  
 Kingston Langtown Lachington Newport (Monm.) Odell Opton West  
 Cowes 3 Bow (Midd.) Carmarthen Chepstow Derby Hurst Green Kin. ston  
 Mertham Ryegate 4 Balcomb Boothe Kingst. Kirkham Y. Moreton  
 Hamstead Narbeth Norwich Stokely Stowbridge 6 Althorpe-Bojam Brad-  
 ford Barnham 3 South-Cave Dalton Daventry Dorchester Gillingham  
 Great-Tey Hamton Howslow Lenham Messingham Misbourne Port Ostend  
 Pembroke Pontipool Pool (Montgom.) Rayleigh Rowel Rudgely Rudg-  
 wick Seale Southampton Southwold Sutton Toddington Ulk Watford  
 Williton Windsor 7 Abergavenny Holywel. Montgom. Sheffield Somerton  
 Sutton H. Swinfield Warford Weeton 8 Aberfraw Raven Glas 9 Ceir-  
 whyth Carphily Chapel in le Firth Chirk Christ-Church Harlech Kidder-  
 minster Kilkhampton Lannerchymead Neath Penzance Steyning Stortford  
 Thrope near Egham Weobly 10 Brew Coventry Ingham Pentre Rhon  
 Tostington 11 Amersbury Axbr. Brandon Chipman Chudleigh Gaywood  
 Grampound Lanrwit Liphoc Menchins Newham (Gloc.) Overton Stan-  
 ford Stanton Stratford Toleham-Darey Workingham 13 Banbury Barton  
 (Linc.) Belton L. Bines-green Clun Darling Devins Hallaton Haverford  
 West St Neot's Prescot Kofs Whittiesea (Isle E) 14 Alesbury Hailtham 15  
 Brampton Manningtree South Moulton Ramley 16 Falkingham Fro-  
 gatheath Poffstead Wrexham 17 St Alban's Bradfield Grimby Taunton  
 Thorne 18 Chepstow Rothersfield Stockland 20 Abingd. Coleford Howey  
 Maidst. Stamford White-church (Hants.) 21 Aldeburgh Bishop Auckland  
 Land of Linwest Newbrough Tiverton Worklop 22 Appledore Barfield  
 Bettw. Blethingly Brampton Broadwater Burroughbridge Crois in hand  
 Halefowen Hatherleigh Havant Holt (Derb) Horncastle Lambert-Castle  
 Ledbury



Leadbury Macclesford Newport Pagnel Selby Shipton Tewksbury Wade-  
bridge Wellington (Salop) 23 Landegla 24 Alconbury Alesford Barner  
Bentham Boughton Bradwell Bridgewater Bromsgrove Cambridge Canew-  
de Colchest. Debenham Farnham Flint Franhfield Glemsford Hadleigh  
Halifax Kirkham (Lancash.) Leighton (Yorksh.) Moor-Kirk Mechhad-  
ham Newn Newton Abbot Orfort. Preilston Rumford Shalfisbury Silverton  
Sodbury Wallingford. Wells Witheridge 25 Bangor Barner Canvy Island  
Forrest Row Malham 17 Bullth Cat-street Machynleth Newport (Pemb-  
roke) Perthore Sarnfollodyn Wigan 48 Bolton (Yorksh.) Bradford  
(Yorksh.) Folkstone Hadstock Harrold Higham-Ferrers Huntingdon Lan-  
vylling Standish Yeovil 29 Axminster Bele Bath Beccles Bennington Brack-  
ley Bradford (Yorksh.) Buckfastleigh Buntingford Camborn Cardiffe  
Great Clacton Fareham Grassington Hartly Row Hinton Hoddon Hook  
Norton Hunspil Landrake Linfield Langerniew Loftwithell Mainfield  
Newham (Kent) Oakhampton Olney Red Lynch Reepham Rhyddlesfryd  
Spalding Stafford Standish Stebbing Tolesbury Tring Wadhurst Watton  
Wem Winterburn Witney 30 Bradford (Yorksh.) Bridgenorth Buxhead  
Harlech Thwaite.

July 1. Griceth Douglwyn Haslingden Hereford Newenden Penhurst  
Thorney (Isle E.) 2 Invelcheester Richmond Testinivg Toller down Walton  
(Eft.) Wickwater Yaradmirik. 4 Broughton H. Chesterfield Dolegelly  
Falkingham Green-pole M Leek Salop Sidley Spuffy Staglawbank Wake-  
field Whitesmith. 5 Ashbourne Bedale Bedford Beverley Bishop's Castle  
Brecon Brufet Burford Chester Chesterford Church Whitfield Clayton Con-  
gleton Couthorpe Croydon Devises Dorchester Easingwoud Eyminge Glou-  
cester Harlestone Harriotsham Haxey Hertford Kinnington Lancast Lan-  
ceston Leicest. Lincoln Little-bourn Lanerillo Messing Potton Narbeth  
Newbery South Petherton Pevensey Plint Pontipool Probus Raiton Tor-  
rington Tunbridge Ulpho Underwood Wainfleet Wakefield Wareham  
Warwick Wenlock Winterton Woodland 6 Bedale Kettlewell Newcastle  
(Staff.) Royston. 7 Bovey Tracy Brentwood Brumhill Chapel in le Firth  
Kenninghall Laycock Northorp Painpili Penryn Taunton Uppington White-  
church (Hants). 8 Southwater. 9 Langadock Macevleth Uffculme.  
11 Abbotbury Ashington Bala Blandford Buckingham Burnley Carmar-  
then Driverton Foulney's Island Frodingham Godalming Grantham Hol-  
lington Holsworthy Hythelver Knotsford Lampeter Leeds Leominster Mac-  
clesfield Market-Botsworth Malborough Mountforrel Pembroke Peterbo-  
rough Petersfield St Peter's Portsmouth Ringwood Scotter Sevenoaks  
Southam Stockbridge Stoken Church Stowmarket Sudbury Talgarth Tha-  
verton Upton Wolverhampton York. 12 Caerwith Howdon. 13 Gon-  
gleton East Grinstead Neath Swanzy Woburn. 13 Spilly Winteringham  
15 St Asaph Dronfield Great Bedwin Little-Hadham Bury-green Prittle-  
well Seamore Stevenage Twyford Up-holland. 16 Burton Helemfley  
Blackmore Milksham Newmarket (Flint) 18 Albrighton Albury Put-  
more Heath Atherstone Banwell Bentley Biddeford Camelford Chipping  
Norton Cirencester Denbigh Emsworth Fenny Stratf. Haverfordwest Hor-  
sham Kirton Lanidlos Landybidder Moreton-Hamstead Morpeth Newca-  
stle (Carmarthen) Overton Patrington Penrice Sherborne Stockton  
Tenbury Topcliff Wantage Warrington 19 Bolton (Lanc.) Carphilly  
Clay. 20 Alfreton Barkway Bergholt Betley Carleon Heltstone Honiton  
Kingbridge Leonard Stanley Rol. Tenby. 21 Breeding Bromyard Clithe-  
be Corwen Garfang Swastham 22 Allington Buggelwade Billericay Ch-  
" 22 Dartford Ely Frome Haworth Kidwely Monkton Newton (Kane-  
Ranley Tetbury Wingest 23 Colchester 25 Alnwick Alresford Bts)  
Iard-Castle Berkhamstead Iliden Bristol Bromley Campden Castle-Aar-  
Chelwood

Chelwood Little-Clackton Derby Dunwich Errith Epsom Ewghust Fother-  
 inghay Giffing Harpley Hockhold Ipswich Lambiader Lieth (Kent) Lid  
 Lindley Liverpool Luggershal Malpas Middlewich Milton Milverton North-  
 down Poulkington Poulton Reading Seaford Shoreham South-Reppo Stap-  
 pel Stone (Staffordsh.) Tiptery place Torrington Totnells Tregony Trew  
 Trowbridge Great-Wakering Waltham (Hants.) Wigmore Wisbech in  
 the Isle of Ely Yarmouth (Hants.) 26 Abbey Milton Care Hastings Horse-  
 manden Kirby Laneliom Landfawell Leighton (Bedfordsh.) Post-Down  
 Sherborne Tamworth 27 Falmouth Market Deeping Newport (Salop) 28  
 Leek Menchiot Winchomb 29 Chiley Matingley Wevelsfield 30 Chilmark  
 Hornby Lamamon in Yale.

August 1 Angmering Barten (Hants) Betheriden Brightlingsea Brook-  
 land Broughton (Lancash.) Burnham (Norf.) Chepstow Cersle-heath Cow-  
 bridge Cowlung Exeter Frampton Henfield Hoo Lampetar Landover Lan-  
 trislet Lidfordgreen Loughbrough St Margaret's near Malborough New-  
 ent North-curry Odiham Otley Partney Reddish Slaidbarn St German's  
 St Neot's St Steven's Stogumber Summerton Thandiston or Francien Ut-  
 toxeter Uxbridge Wisbeach (Isle of Ely) Whitehaven 2 Wattisfield Bridg-  
 north Calne Chulmery Headon Ickleton Ivelcheffer Kelsiff Kingston  
 Kington Langeridge Long Cromarshi Magdan hill near Winton Mold  
 Newark Norwich Stockbury Stony Stratf. Thel Wedmore Wisbeach Yarm  
 3 Daventry Hitcham Kingston 4 Canary. Earl Soham Elther Higham Fer-  
 rers Landegla Kingston Teirsk 5 Altringham Ashton under Line Audley  
 and Bicester Boscastle Castle-Town Chard Cheltenham Chertsey Chichester  
 Doncaster Dorchester (Dorset.) Dudley Eccleshall Garner-street Hatfield  
 Broad Oak Hexam Kirkoswald Lansfchell Langis dairn Northampton  
 Oakhampton Queenborough Raven-Glass Rhos Fair Saltash Skipton Stam-  
 ford Staverdall Trampston Thirsk Wattlebury Westbury (Salop) Wetherby  
 6 Baldock-East Isley Goldsmithay Holtwood Minsfeld Rhayadar St Ann's  
 Hill (Deviz) 8 Crowcomb Curry-Rival Horning Howey Ruthin Shepton  
 Mallet Shuinal Stamford 9 Lanwrst. 10 Allur-church Appleby Ash-  
 burton Deddington Duffry Flint Hawkhurst Hurstperpoint Landown  
 St Lawrence (Cor.) St Lawrence (Kent) Leachled Membury Newburgh  
 Piddy Snaith Thaxtead Waltham St Lawrence Warminst, 11 Boston  
 Dunningworth and Snape 12 Banbury Bettw's Bridford Cergwrcly Car-  
 marthen Chriffingham-Magna Dunhold Dunstable Feversham Green Hay  
 Higworth Hornsea Linfield Malling Newcastle upon Tyne Newton (Lanc.)  
 Plympton Sheepwash Shrewth Slafor Stowmarket Talybont Treganatha  
 Uffculme York 13 Bakewell 15 Attleburgh Caphilly Keynsham Lelant  
 Liskeard Lanufydd Market-Weston Newport (Mon.) Oswestry Ottery  
 St Harmon St Mary-Hill Stamfordham Thornbury Treastle Tutbury  
 Worcest. Yarlinton 16 Ashbourne Brig Burgh Louth Pentraeth-Mon  
 Telsham 17 Dallwood Donnineton Knaresborough Landerfel Landfannan  
 Penny-street in Tiawsfyand 18 Aberwingregin Beddgelert Chapel in le  
 Firch Clynngofawr Emriworth Navenby Rippón Settle 19 Clack Pwllhe-  
 ly Reath Settle 20 Abergely Blackmore Chorley Moorlinch Fenmoria  
 Settle Weldon 22 Arundel Bedford Cayo Cheddle Crediton Farnham Frod-  
 sham Haneford Harlech Hartlepoole Horacastle Hungerford Kilgarren  
 Kilham Langollen Ludlow Martack Melton-Mowb Mwaras Newburgh  
 Oundle Romney Rugby Settle Strond Tefsting Winstow Wandford Eagle  
 23 Belford Botley Penmachno 24 Abbot's Blomley Ashby de-la Zouch  
 Barret South-Benffest Brachnell Buckfastleigh Chipping Cranborne St  
 Becuman's Eglwysfach Kipmash amber. Castle Lee Lofswisell Meer New-  
 berry Salfot Southwold Wainfleet 25 Barret Bingley Coxwold Elef  
 beere Heughley Hermitage Landrake Lansaver Nefyn Partney Ripley  
 (Yorksh)

(Yorksh.) Watchet 26 Bampton (Oxfordsh.) Barnet Bingley Bleagon  
Borth Carlisle Corby East-Brent Elfdon Gifborough Gourdhuft Haverhill  
Hermitage Hinkley Ilminster Little Driffield Northampton Porthæthwry  
Preston (Lanc.) Rhos Fair Ripley (Yorksh.) Romsey Swanzy Stroud  
Tolliterton 27 Bingley Cerigv Druidion Gifborough Ilminster Rayada  
Ripley (York.) 29 Cowston Grefsford Kilmington Lannerillo Morbath  
Overton Pampill Philip's Norton Seampford Peverell Tarperly 30 Linton  
Newn Spalding 31 Brampton Lambert Castle South-Molton Wicks.

September 1 Alton Dronfield Gillingham Marnham Pontefract Spittle  
Tregony 2 Hingham Holywell Kettlewell Penkridge Steeple Ashton Snaith  
Stevenage 3 Lanidlos Long Preston Trefrehiw Wirksworth 4 Aberconwey  
Beaulieu Brighthelmst. Brigstock Buckingham. Burnham (Essex) Burwash  
Chipping Norton Chorley Corham Crewkerne Egton Firmingham Frampton  
Hatherleigh Haverford West Horringer Kidderminster. King's Norton  
Kington Lampeter Leominster Maresfield Monmouth Montgomery Nampt-  
wich Newcastle Old-Chapple Playden Redruth Road Sidmouth Silverton  
Stallbridge Stockwith Tewksbury Toddington Wanbrough near Guilford  
Warrick Westham Whittingham Wivenhoe 6 Baddlesmore Camelford Don-  
nington Market Raism Ware 7 Holy Cross Kilmington Newton-Abbot  
Preston (Lancash.) Stowley Tidswell Wyomndham 8 Bishop's Lydeard  
Cardiff Cardigan Denbury Frittenden Glastonbury Ormskirk Rudland  
Snowbridge Talsarn Wyomndham 9 Ashford Bishop's Castle Broadwothy  
Cæirwyth Carmarth Epworth Fordingbridge Harlestone Harlow Helstone  
Leachlade Newent Tavistock Welton Zoyland 10 Brecon Dinasmonddy  
Fowey Newport (Salop) St Mary-Cray 12 Adverfean Brentf. Dundry  
Foncett Giles Hill near Winton Horsebridge-Common Horstead Kaynefs  
Neath Oakham Poole (Montgomsh.) Stogursey Tamworth Tollerdown  
Wareham Wilton Wimple 13 Brentford Dilton Marsh Hölberch Iron-act-  
on 14 Ashill Bassildon Brentford Congerbury Frome Goodnestone Lincoln  
Pickering Richm. Ryegate St Udey Sumer Court Wherewell Winbourn  
Witham 15 Brentf. Durham Grimsby Mark Sandback Upton 16 Bettws  
Freshford Lutterworth Tillingham Woolpit 17 Bellingham Lanwrst Lee  
Mafham Northiam Penrice Probus Wanton Wilton Wilmington 19 Abingd  
Amerthom Atherstone Barnstable Beaminster Beaumaris Breewood Buck-  
land St Mary Callington Carlisle Chatham Clack Crawley Cuckfield East-  
menon Egremont Gifborough Gifbourn Harbottle near Rothbury Kirby  
Moor-side Landysell Little Driffield Machynfeth Malden Market Drayton  
Mathamp Northamp North Bradley Painswich Partney Shouldham Silmi-  
ston Stains Steyning Sturbich-Fair Swindon Uk Uttoxeter Waltham (Lei-  
cestersh.) Waterleigh Week St Mary Westerham Woodbury-Hill near  
Bere Worcester Wootney-Courney Wrexham 20 Dolegally Gifborough 21  
Backwell Basingstoke Downs Bridgw. Burnham (Bucks) Cærlion Chud-  
leigh Clapham Crediton Cricklead Evesham Hawl-head Ireby Knighton  
Liskeard LymeMaiden-Bradley Manchest. Padstow Penmachno Peny-street  
in Trawsfyndd Plymouth Reading Shadbrock Silfoc Tendering Thorney  
in the Isle of Ely Woodbr. 22 Lannarth Lewuwlynn Yarborno' Castle 23  
Boddgelert Clynnogfawr Derby Saxmundh Talgarth Tuxford, 24 Boote  
Haverford West Langport Pwllhely Stretton Church 26 Abergavenny A-  
rundel Aylsbury Boston (Lincolnsh.) Bungay Burford Chesterfield Clayton  
Denbigh Easingwoud Grassington Groomb Hartland Haselmere Headon  
Ipswich Narbaoh Newburgh Padiham Pembroke Penmorfa Porthæthwry  
Ramsbury Rhayadar Rockingham Rotherstfridge Shroton Spalding St Ste-  
phen's Stratford (Warwicksh.) Tattershall Testiniv Tenbury Thrf-Tich-  
field Waltham-Abbey Weighon Wivelscombe Wotton-Underidge Wy-  
comb. 27 Aylsham Derby Dorstone St Ninian near Fenton Pow-Batch Ro-



gate Spotty 28 Chesham Dereham Glocest. Landrihiadar Ludlow New-  
 ridge Northleach Stamford 29 St Alban's Alton Ash Blackobys Canterb.  
 Chogford Cran-Brook Framlingh Frowenn Henly (Oxf.) Hope Horsebridge  
 Langerneaw Linymyheck Lowestoff Maidenhead Market-Jew Meer Smith  
 Southminster Stoken Church Teignmouth Tring Wallint. Watten Wood-  
 ham Ferris 30 Blackburn Broughhill Teckenham Lanelly New Church  
 Ongar Ruthin.

October 1. Brachnell Brading Bronisgrove Culmston Dinafmonday Ha-  
 warden Catharine Hill Otly Redruth 2 Aberguilly Appletreewich Bal-  
 dock Beccles Bolton (Lanc.) Braintree Buckingh. Budworth Boilth  
 Burgh Cerne Colehill (Strafford.) Coleshall (Warwick) Creyon Daven-  
 tre Devizes Downton Dudley Eastbrey Frodingham Hambledon Hemley  
 Blackmoor Hingham Holdsworth Lamborn Howden Ladbury Lewes  
 Malling Nayland Northallerton North Tawton Notting. Peterborough  
 Retford Rothbury Rodam Sherstone Shrewsb. Stafford Swinehead Tarring  
 Warham Wendover Woodstock 3 Corby Hounslow Nottingham Pentraeth  
 Mon Sherborne Worlop 4 Alnwick Harrold Macclesfield Malham Not-  
 tingham-Pentraeth Mon Ubley Walsall 5 Axminster Brulwyn Ingle-  
 while Lansadwyn Laneloni Lanvyllyng Leighton (Huntingdons.) Rochf.  
 Royston Steeple 6 Bishop Auckland Blyth Brackley Layo Chapel in le Firth  
 Chertick Dewsbury East-Hagburn Gaywood Market-Raisin Porlop Sher-  
 bourne Wobourn 7 Billericay Bury Stockton 8 Challock South Monlton  
 10 Aberconway Abergenny Bhrenslley Basingstock Bedel Birming Blockley  
 Brent Bridgeport Buckland Carmarthen Charlbury Chester Chicheit. Cock-  
 ermouth Corwen Deal Dolegally Eastbourn Falm. Fazley Fenny-Stratf.  
 Gelpport Great-Thorlow Hadleigh Hartlepool Haslingden Hay Higham-  
 Ferrers Hodnet Hull St Ives (Huntingdons.) Kegworth Kettering King-  
 island Lancaster Lanvichangel Lavanham Leicester Leadher-Looe Malton  
 Mardan Market-Deeping Mathry Milden-Hall Milverton Mitchael Dean  
 Moreton Newhaven (Suffex) Norton Ower Mayne Penkridge Pentree  
 Pontypool Rofs Rushlag-Green Sittingbourne Selby Sheepwash Shefford  
 Shouldham Sleasford Leonard Solybull South-Brent Steyning Stony-Stratf.  
 Stortford Stow (Lincolns.) Swindon Tavist. Tewksb. Thame Tiverton  
 Torrington Uxbridge Wadebridge Watlington Wells Weyhill Witham  
 Yarm 1 Bedale Bedf. Blackheath Bunley Coln Kinsclear Monkton Salis-  
 bury Sellinge Shiptone Wragby 12 Gaxton Ditchling Hitchen Landover  
 Northorp Otterton Sevenoaks Suckle-bridge 13 Banbury Chaple-Cunnon  
 Epping Lymington Mansf. Rackham Rhos-Fair-Wigan Windsor 14 Ha-  
 worth Leybourn Sarr Trecattle Waltham H Wells 15 Ashover Carlile  
 7 Alcester Alphonston St Asaph Bakewell Belbroughton Christ Church  
 Cowling Donnington Havant Ivishoe Knarethorrough Lanrhiad Dyffin  
 Alwyid Lemuwchillyn Maidst. Navenby Swinstead Thorne Turner's hill  
 Wellow Wenlock Wooler 18 Barnet Belbroughton Little Brickhill Charle-  
 eton Chipman Chisleborough Cowbridge Griceleth Dorstone Eversley Far-  
 nington Halesworth Harwich Hatfield Haverford-west Henley (War-  
 wicksh.) Hindon Kirham (Lancash.) Lanttrissint St Lawrence Laxfield  
 Luton Midhurst Newham (Glocester.) Newton-Peppelford Overton Part-  
 ney Tidswell Uphavem Uik Winterbourn Workington 19 Abbotford Bar-  
 net Corfe-Castle Lemamon-in Yale Lampeter Market Harborough Partney  
 Sowthidgeworth Testning Trevena Whitechurch (Hants) 19 and the  
 two following Saturdays at Cergy Druidon Chichester Colchester Devizes  
 Elham Ely Gainsborough Hereford Kingsbrampton Rothersfield Slaidburn  
 Tenby 21 Blackburn Bridgrinton Concord Rudgely 22 Barking Beoth  
 Carlisle Clithero Newmarket F Newport-Pagnel-Overton 24 Aberfran-  
 Brampton (Devonsh.) Borth Burrow-bridge Caister Ciesaydog Dalton  
 Harling



Harling Hastings Langel-nock Lansawell Leighton (Bedfordsh.) Lenham  
 Market-Drayton Marshfield Matlock Newn Portathwry Ripley. (Der-  
 bysh.) Spatty Stow (Glocestersh) Sturminster Tamworth Upportery Wain-  
 fleet Winton 25 Aberwingregin Cartwell Mortimer Potton Pershore Queen-  
 Camel Srockport Whittlesea in the Isle Ely 26 Abberford Grantant Lan-  
 degia Lantannan Ovingham 27 Aberguilly Bromyard Cærgwily Glenbury-  
 Mortimer Darley Flash Daventry Marsh in the Isle of Ely Nantglyn Ul-  
 verstone 18 Ashby de la Zouch Askrig Bangor Biddeifden Blygleswade  
 Chepstow Cullumston Dis Droitwich East Dean Edwinstone Forest-Row  
 Lanidlos Llistone Linsfield Malbourne Port Needham Newbury Newmarket  
 (Suff.) Pocklington Plympton South Hartling Thirsk Totness Warminster  
 Watton Whitechurch (Salop) 29 Abbey Holin Ambleside Askrig Panbury  
 Bourn Bridgenorth Broadwater Bourton Chagford Charring Chedder Ewell  
 Hatfield Hampton Henley (Oxf.) Holt (Denbighsh.) Howey Hunmanby  
 Kidwely King's Cliff Kirk by Stephen Marlow Mongham Newcastle  
 (Northumb.) Pleasley Radnor Sedberg Stainton Thirsk Towcest. Tun-  
 bridge Wellingborough 31 Crowcomb Lantlechyd Newhaven (Derbysh.)  
 November 1. Coventry Darith Fordstreet Lanybidhr Lytcham Newark  
 Prescott Rothbury Settle Wadhurst Walden Wingham 2 Altringham  
 Bletchingly Buckland Chard Downham Farnham Helmsley-Black moor  
 Hoxne Lostwithell Loughborough Toddington Wilton Workingham Wye  
 3 Broomfield Campden Poole. (Dorf.) (Swastham Talgarth 4 Ecclethall  
 Litchfield 5 Applehaw Lanfeschell 7 Barwick-Hill Helmsley-Black moor  
 Horley Lampeter Manchester Middleham moor Newton-Abbot Newcastle.  
 (Stafford) Newport (Monmouthsh.) Rochdale Sutton (Hants) Talsam  
 Trefrihiw Tregony Wichebury 8 Aberconway Alford Barton Underwood  
 Bingham Blandf. Buckingham Chilham Chipping-Norton Cirencester. Dul-  
 verton Dunmow Hatherleigh Heistone Hertf. Hexham Kendall Kighly  
 Knotsford Lamedy Lanhiader Leeds Leominster Lidney Malingham Pens-  
 ford Romsey Stamford Stratton Sutton (Warwickshire) Warwick Whitstone  
 Woodstock 9 Albrighton 10 St Austle Cæirwith Chapel in le Firth Falk-  
 ingham Perlock Ruthin 11 Ashburton Brandron Cambron Langport Len-  
 ton near Nottingham. Liverpool Maccles. Newburgh Nunny Penrith Pwll-  
 hely Reeth 12 Amlwch Bisley Blackney Brumpton Callington Camrass  
 Chelmsf. Chirk Dunstable Fairford Halcheston Kilgareen Kilham Lanwi-  
 nion Lincoln Little-mountain North Moulton Penmorsa Penrath Mon-  
 Rowland's castle Stelling Stony-Stratf. Three-Lords Wakefield Wooburn  
 14 Allantown Ambesbury Biddeford Bishop's-Castle Carmarth. Dinasmond-  
 dy Elefimer Gisborough Hunting-Kingst. Lanerillo Leck Lodden Mayfield  
 Montgomery Porthathewry Testinivg. Treacastle Wakef. Wotton Bassett  
 15 Egton Otley 16 Andover Beverley Poole (Montgomerysh.) 17 Brecon  
 Bridgend St Colum Heaton Aunmanby Ingletton Launcest. St Leonard's  
 near Belford St Leonard's (Suffex) Malling Newp. Otterford Warsof  
 Willington Wells Yeovil 18 Cuckfield Dorstone 19 Cross-in-Hand. Truro  
 21 Aberwingregin Conwydd Dolton Felton Feltwell Lanusydd Lanybidder  
 Petworthe Ruabon Skipton 22 Battle Bawtry Boscastle Bow (Devon) Brig-  
 stock Chinn Crowle Darlington Deddington Dolegelly Dover Fairback  
 Falkingham Fillingham Guilf. Haltwittle Hemton Langollen Lawhaden  
 Marl Martin's Towmb Mould Monm. New Backingham Newcastle  
 (Garmantbenfsh.) Pembridge Rippon Rugby Scarborough Shafsb. Shif-  
 nal Skipton Stamford-Bridge Standish Storrington Warkworth Wem We-  
 therby York and every ether Thursday in the Year at York 23 Whitney 24  
 Colesford Eglwysfach Holt (Norfolk) Langtown Penzance 25 Chelsterfield  
 Chipping-Norton Elstow Frome Gravesend Maehynleth Thwaite 26 Castle-  
 town St Ives Landoverly Lanfeschell Little-Dean 28 Bakewell Eglwswra  
 Fenny.

Fenny-Stratf. Gloucest. Goriynon Harlow Hartlepool Hook- Norton Hor-  
 sham Northamp. Sheffield Spaldick 19 Ashborne Endfield Langerniew 30  
 Alfrilton Belchamp St Paul's Broadheimbury Bromhall Buntinford Cardiff  
 Chipham Colyton Cubley Flint Fring Hempsall Lanfanna Maidenhead  
 Moreton Hamstead Northwoud Prestefgn Warrington Wells Week St  
 Mary.

December 1. Hythe Ingatestone Peurice Rotherham Tutbury 2 Spotty  
 3 Ashton under line Bettws Garstang Louth Talgarth 5 Atherstone Can-  
 nary Dursley Gressford Lamborn Newark Penybon Pluckly Sandwe Traff.  
 Tenby Wenlock 6 Bodmyn Builth Cornhill Cranborne Exeter Greffighall  
 Launcest St Nicholas Northwich Sidlan Stoke (Norf.) Tockington Tod-  
 dington 6 Cerigy Druidion Clithero 7 Lanellam Leicest Ludlow Malpas 9  
 Barnstaple Bradfield Leybourn 10 Bewdley Bolney Laton Liskeard New-  
 market El. Newport (Salop) South-Moulton 12 Aberfraw Abingd. Ampt-  
 hill Baldock Bettws, Bewdley Bolney Boston Brackley Chagford Chawley  
 Coham Colingburn Duces East Grimst. Gargrave Gringley Harlech Kim-  
 bolton Kirton Langadock Lanport Lanrwst Narbeth Ofwestry Petersf Ring-  
 wood Rochest. Rofs Shrews Stratton Tavistock 13 Bedale Knareth. 14  
 Thirft, Trecaſtle 15 Kettering Namptwich 16 Comp St Nicholas Dole-  
 gelly Newn 17 Arundel Grantham Helstone Higham Ferrers Hornse St  
 Neot's North-Tawton Spalding Wallingford Woodst. 19 Beaumaris Bedf.  
 Gardigan Ledbury Northamp. Pain's-Castle Thornbury Truro Wotton-Baf-  
 fet 20 Bradf. (Yorsh.) 21 Boxford (Yorsh.) Droitwich Grinton Ha-  
 warden Higbickinton Kirby-Longdale Laycock Penryn 2 Bradford  
 (Yorksh.) Carphilla Newport Pagnell 24 Alnwick Hawarden Lanwnen  
 26 St Afaph Beckley Corwen 28 Cock Hill 29 Bridgewater Stonehoufe 30  
 Milbourn.



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